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STEEL

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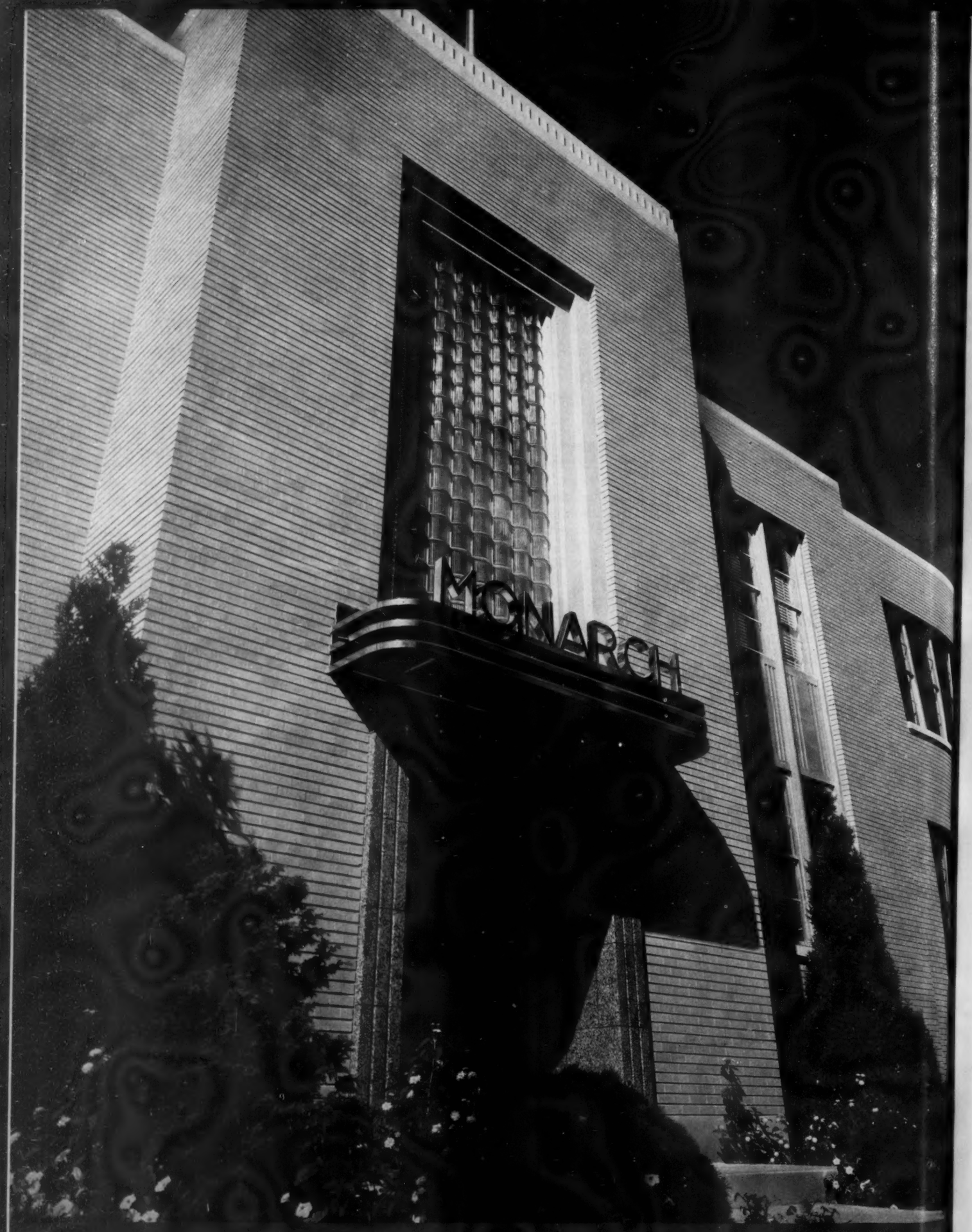

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THE MONARCH MACHINE TOOL COMPANY — SIDNEY, OHIO

STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

HIGHLIGHTING THIS ISSUE

■ MOMENTUM gathered rapidly last week behind the drive to augment the supply of armament to the Allies and to strengthen our own national defense. Orders are being placed by the Allies (p. 21) in much larger volume and for requirements more diverse in character. More business also is being placed (p. 22) by the army and navy. Under the impact of these demands the steel production rate last week (p. 27) moved up 4½ points to 86 per cent of capacity. Indications that the expanding armament program is likely soon to reveal shortages in the supply of certain steels throws into sharp focus the necessity (p. 40) for simplifying existing steel specifications.

♦ ♦ ♦

Industry Can Meet Needs

More industrial leaders have been enrolled by the national defense commission. Walter S. Tower (p. 23) is the liaison officer in charge of the steel industry. Ralph E. Flanders and Howard W. Dunbar have been named to the machine tool co-ordinating committee. . . Leaders in most key industries feel entire confidence in the ability of those industries to meet all needs. This statement by Mr. Dunbar (p. 23) is typical: "The machine tool industry is in a position to turn out all the machines the government needs despite its present high rate of operation. All we want to know is what the government wants and when it wants it and the machine tool industry will get the machines out."

♦ ♦ ♦

Alloy Prices Advance

Congress passed three major preparedness bills last week (p. 23) and sent them to the President for signature. It is acting rapidly on other related measures. . . Canada is adding fresh speed to its armament program (p. 26) and will call on the United States for more steel, airplane engines and other manufactured goods. . . . Italy's entrance into the war (p. 24) closes the Mediterranean to American shipping and cuts off our supply of Russian manganese ore, also iron ore from Mediterranean ports. . . Rising manganese ore prices (p. 83) have brought a $20 per ton advance on ferromanganese and spiegeleisen is $4 to $10 higher. Silicon alloys are up $5 to $10 a ton. Scrap prices have mounted further.

♦ ♦ ♦

Rapid Tin Analysis

Paul J. McKimm (p. 54) tells how to keep out of trouble in the soaking pit department. He also reveals an improved method (p. 62) for making rapid tin determination . . . In machining car wheels (p. 62) a new high carbon, high-vanadium tool steel was used at a speed of 16 feet per minute with a 7/16-inch depth of cut and a feed of 7/16-inch . . . C. W. Drake (p. 47) describes a motor which drives its load through an "electric shaft." "Synchrotie" transmissions offer a means of tying movements together at two or more points without any mechanical connection whatever. The principle has many potential applications . . . With a new solution (p. 74) steel can be coated with copper without the use of current.

♦ ♦ ♦

Avoiding Distortion

George Ralph (p. 64) discloses methods that cut die and other costs in producing stamped meter parts . . . Sam Tour (p. 72) sees new potentialities for stainless steel as a result of new electropolishing procedure . . . A new electronic welder (p. 74) simplifies joining of thin sheets and intricate work on turbine blades . . . Joseph C. Lewis discusses methods for proper welding of sheets (p. 68) in preparation for porcelain enameling. He tells how distortion may be avoided by using fixtures of ample heat capacity . . . Mechanical sorting equipment permits an airplane manufacturer (p. 50) to save $12,500 yearly through salvage of materials . . . Notable field fabricating setup is that (p. 44) at Grand Coulee dam.

E C Kreutzberg

How to Save Money on Steel

Reduced shop labor costs . . . Elimination of heat treating failures, costly testing and re-treating... less clerical expense —these are money-saving advantages regularly reported by manufacturers who standardize on Ryerson Certified Steels.

Steel buyers know exactly what they're getting when they order from Ryerson. These uniform high quality steels are made to close range specifications. They are free from hard or soft spots and can be depended on for uniform working and forming qualities. Spoilage, breakage, and irregularities are practically eliminated.

A special quality control plan on Alloy Steels assures uniform heat treatment response. Entire heats are selected and complete chemical and physical properties, and exact heat treating characteristics are sent with every order to guide the heat treater in securing dependable, uniform results. He does not have to test. He takes no chances. Spoilage and re-treating are eliminated and a sound, dependable job is assured.

Ryerson Certified Steel stocks are complete and diversified. You can save time, trouble and money by concentrating all steel requirements with this one dependable source of supply. Everything from the heaviest structural to the smallest rivet—from mechanical tubing to welding rod is carried in stock for Immediate Shipment. If you do not have the current Ryerson Stock List we will gladly send you a copy. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON PRODUCTS *Include:* Beams, Structurals, Channels, Angles, Tees, Zees, Hot Rolled Bars, Bands and Hoops, Floor Plate, Plates (over 15 kinds), Sheets (over 25 kinds), Alloy and Tool Steels, Heat Treated Alloy Bars, Stainless Steel, Cold Finished Shafting, Strip Steel, Flat Wire, Mechanical Tubing, Boiler Tubes and Fittings, Welding Rod, Rivets, Bolts, Nuts, Washers, Concrete Reinforcing, Babbitt Metal and Solder. *Write for Stock List.*

RYERSON CERTIFIED STEELS

RYERSON

Allies Buying More Steel, Munitions: Arms Pressure Gains Momentum

Steelworks Operations at 86 Per Cent: Raw Material Prices Stronger.

Contracts for $327,000,000 Warship Construction Awarded in Week.

Purchasing Through Existing Federal Agencies "for Present".

Congress Rushes All Roosevelt Appropriation Measures.

President Creates Industrial Research Committee.

Machine Tool Industry "No Bottleneck".

■ BUSINESS apparently is experiencing an earlier stimulation than had been expected from the national defense program. This was reflected last week in steel production, security markets, a variety of manufacturing operations, employment, retail trade and other indexes.

Steel operations advanced 4½ points to 86 per cent of capacity, up 22½ points since the first week in May. The stock market, which for several weeks had been closely geared to European war developments, began to reflect the increase in domestic business and regained a large portion of recent losses. Raw materials prices stiffened as manufacturers who cannot hope to benefit from possible priority allocations, because of the type of goods they produce, moved to protect themselves on future deliveries. Increased employment, especially in industrial centers, was felt in retail trade gains.

Another strong factor was this country's determination to provide all possible material aid to the Allies. More airplanes, munitions, and other war material are being released by the government for resale to Britain and France. The Anglo-French purchasing commission is pressing for immediate delivery of all available machine guns, rifles, ammunition and other materials.

The Allies continued to place heavy orders for steel, munitions, and transport equipment with private manufacturers. An order for 10,000 trucks was reported placed last week with two leading automobile manufacturers by France. A similar order for British account is in negotiation.

Consensus in the industry is that pressure for steel will continue unabated. Possible further reverses to the Allies, it is believed, will only intensify demand as the United States speeds preparedness.

While it is recognized a period of readjustment would follow cancellation of certain foreign orders, it is pointed out that most, if not all, of the orders could be adjusted quickly to domestic needs.

Study Army, Navy Needs

At Washington the national defense commission is working at top speed to organize its plans. The commission is rushing an industrial survey of army and navy needs. When this is completed, the commission will call industrial leaders into conference on ways and means to eliminate any bottlenecks discovered. Some danger spots already are known, including armor plate, many chemical products, aluminum and strategic materials. None is believed cause for alarm.

Until the commission achieves more complete organization, defense program purchasing will be handled through existing agencies. Use of these agencies will not necessarily slow the program as was evidenced last week when contracts for construction of 22 ships to cost $327,000,000 were awarded within a few hours after the President had signed the 1941 naval appropriations act.

The defense commission last week continued to augment its staff from the top ranks of industry. Walter S. Tower, president, American Iron and Steel institute, was a notable appointee and will serve as a liaison officer between the steel industry and the commission.

Establishment of a new national defense research committee with Dr. V. Bush, of Carnegie institute, as chairman, was announced by President Roosevelt. To include eight members the research committee will survey all the laboratories in government endowed institutions, colleges and industry, so that everything pertaining to national defense may be mobilized. The committee will not go into aeronautics, where research will remain under the national advisory committee for aeronautics. The President said the research committee is being formed with the full approval of members of the national defense commission. He will confer with commission members before selecting other members.

Congress moved rapidly to execute its part in the armament program. Three major preparedness bills last week were submitted to the President for signature. These included the $1,821,853,000 army appropriation bill which the President already has signed, a $655,000,000 authorization bill providing an 11 per cent expansion of the navy, and a $2,200,000,000 measure to authorize a naval air force of 10,000

planes, 16,000 pilots and air bases.

Resolution authorizing the President to acquire machine tools and similar equipment for defense purposes without advertising or competitive bidding was introduced in the senate.

The house, with only one day's discussion, approved the new billion dollar tax bill and sent it to the senate where favorable action also is expected.

The senate adopted a bill empowering the President to prohibit exports of machinery, tools, military equipment or munitions. A similar bill previously had been passed by the house.

Iron and steel scrap exports would be prohibited in a measure introduced in the house. Commenting on the proposal at press conference, Mr. Roosevelt said its purpose is to keep in the United States those materials needed in our defense program.

22 Warships, Taking 75,000 Tons of Steel, Top Week's Orders

■ CONTRACTS for 22 ships, totaling $327,233,000, were awarded last week under the navy's 1941 fiscal year program. The awards, reported to be the largest transaction of its kind in this country's history, followed closely the signing of the naval appropriations bill by President Roosevelt.

More than 75,000 tons of steel will be required in the 22 vessels, in addition to a considerable tonnage for equipment.

The navy already has 66 warships under construction in government and private yards.

Of last week's awards, 13 vessels to cost an estimated $262,909,000 will be built in government yards. These include: One 45,000-ton battleship to the New York yard; one 45,000-ton battleship to the Philadelphia yard; two destroyers to the Boston yard; two destroyers to the Charleston, S. C., yard; three submarines to the Portsmouth, N. H., yard; one submarine tender to the Mare Island yard in California; two seaplane tenders to the Norfolk, Va., yard; two seaplane tenders to the Boston yard; and one mine sweeper to the Norfolk yard.

Many yards soon will be placed on a 24-hour basis to accelerate the building program.

Nine Awarded Private Yards

The other nine ships were awarded to private builders, as follows: Two 10,000-ton cruisers to New York Shipbuilding Corp., Camden, N. J., at $17,580,000 each; two destroyers to the Bath Iron Works, Bath, Me., at $4,898,000 each; two destroyers to Federal Shipbuilding Corp., Kearny, N. J., at $5,277,000 each; three submarines to Electric Boat Co., Groton, Conn., at $2,938,000 each.

Acting Secretary of the Navy Lewis Compton who announced the awards said the speedy action resulted from "the co-operative efforts" of Mr. Knudsen and the department.

Increase in merchant shipbuilding also was reported last week by the American Bureau of Shipping. Under construction on June 1 were 295 vessels with a total gross tonnage of 1,516,185. This compares with 276 vessels, totaling 1,349,385 gross tons on May 1.

Gulf Shipbuilding Corp. is expected to build four cargo ships of 9600 tons each at its Chickasaw, Ala., yards for the Waterman Steamship Corp., Mobile, Ala. Approximately 25,600 tons of steel would be required for hulls and superstructures.

ARMY TO BUY SCOUT CARS; YORK BUILDS GUN CARRIAGES

United States war department will open bids on 1000 scout cars for the army at the Rock Island arsenal on June 20. Cars will be light and fast 4-wheeled units for advanced guard use and are described roughly as a cross between an armored car and motorcycle.

York Safe & Lock Co., York, Pa., has been awarded a contract by the Rock Island arsenal for the manufacture of 350 carriages for 37-millimeter antitank guns at $2370 each.

Baldwin Southwark division of Baldwin Locomotive Works, Philadelphia, is reported to have received an order for two large presses from the British purchasing commission.

The Willys-Overland plant at Toledo, it was reported last week, may receive a $25,000,000 order for shells, shell casings, light armored cars and parts for bombing planes.

Willys-Overland common stock is controlled by Empire Securities Inc., New York. Another subsidiary, Empire Ordnance Corp., recently acquired a portion of the Pencoyd, Pa., properties of Carnegie-Illinois Steel Corp.

Empire Ordnance expects to manufacture antiaircraft guns for the Allies and for the United States. Equipment for necessary retooling is being installed.

Property acquired from Carnegie-Illinois comprises a 14½-acre tract with 100 x 340-foot machine shop and 83 x 173-foot assembly shop, a blacksmith shop, office building, restaurant and storage yard. No part of the steel plant located in lower Merion township across the Schuylkill river is included.

United States Steel Corp. last week announced it is reselling to the Allies at no profit $37,600,000 worth of munitions, equipment and ordnance which it purchased from the United States government. Transaction will be handled through United States Steel Export Co., a subsidiary. The corporation's announcement:

"The United States Steel Corp. confirmed the preliminary announcement recently made from Washington as to the conclusion of negotiations with the United States government for the purchase by the United States Steel Export Co., a subsidiary of the United States Steel Corp., of various surplus munitions, equipment and ordnance supplies now held by the United States war department.

"The negotiations for this purchase were initiated a few days ago by the United States war department. The purchase price of the articles so purchased is $37,600,000, representing the present value thereof as determined by the United States war department.

"These articles are being resold forthwith by the United States Steel Export Co. to the Anglo-French purchasing board at the exact cost thereof to the United States Steel Export Co.

"It is contemplated that a part or all of the purchase price to be paid by the United States Steel Export Co. to the United States government will be paid through the subsequent delivery to the United States war department of new munitions and ordnance supplies of a character needed for the national defense program and to be specified by the United States war department."

■ Muscoda No. 5 limestone mine of Tennessee Coal, Iron and Railroad Co., Birmingham, Ala., has been awarded the 1939 "Sentinels of Safety" trophy in the nonmetallic group of mines by bureau of mines, United States department of interior. Mine operated 167,712 manhours in 1939 without a disabling injury. Award marks the third time the mine has received the trophy.

■ Revere Copper & Brass Inc. will close its mills June 29 to provide a vacation for employes on an hourly basis. Operations will resume July 8. Offices and warehouses will remain open.

Tower Appointed to Stettinius Staff as Steel Contact Officer

■ WALTER S. TOWER, president, American Iron and Steel institute, has been appointed to the national defense commission's staff under E. R. Stettinius Jr., former United States Steel Corp. chairman, and now in charge of raw materials procurement.

Mr. Tower will serve as liaison officer between the steel industry and the defense commission.

Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt., and Howard W. Dunbar, general manager, machine division, Norton Co., Worcester, Mass., have been named members of the machine tool co-ordinating committee, headed by Mr. Knudsen of the commission.

Charles E. Adams, chairman of the board, Air Reduction Co., New York, and Robert T. Stevens, a director of the Federal Reserve Bank of New York, and president, J. P. Stevens & Co. Inc., New York, were appointed to the staff of Mr. Stettinius. Mr. Adams will be senior administrative assistant and Mr. Stevens will have charge of textiles.

Other appointments to Mr. Stettinius' staff include J. D. East, United States Steel Corp.; W. L. Finger, assistant to the general manager, Rubber Manufacturers Corp.; and T. B. McCabe, president, Scott Paper Co., Chester, Pa.

William C. Bower, vice president, New York Central railroad, will assist Mr. Stettinius in studies involving raw materials procurement. Marion B. Folsom, treasurer, Eastman Kodak Co., Rochester, N. Y., has been appointed a senior administrative assistant. Blackwell Smith, a member of the law firm of Wright, Gordon, Zachry & Parlin, New York, has been appointed legal advisor.

GEORGE S. ROSE APPOINTED STEEL INSTITUTE SECRETARY

George S. Rose has been appointed secretary of the American Iron and Steel institute. After graduating from Pennsylvania State college in 1923 he became associated in metallurgical, production and sales capacities with Alan Wood Steel Co., Crucible Steel Co. of America, and American Steel & Wire Co. For six years he has been a member of the institute staff.

Machine Tool Industry Prepared For All Needs, Says Dunbar

■ "THE NATION'S machine tool industry is no bottleneck in the federal defense program. That should be made absolutely clear," declared Howard W. Dunbar, general manager, machine division, The Norton Co., Worcester, Mass., and a member of the machine tool co-ordinating committee headed by Mr. Knudsen.

"The industry is in a position to turn out all the machines the government needs despite its present high rate of operations," said Mr. Dunbar. "There'll have to be some increase in manpower, but very little in physical plant expansion.

"All we want to know is what the government wants and when it wants it and the machine tool industry will get the machines out."

In preparation for its part in the defense program, the Norton Co. has leased the Industrial building at the Worcester fair grounds and will convert it into an assembly plant for the machine division. The company contemplates no new construction.

Mr. Dunbar, former president of the National Machine Tool Builders' association, outlined the machine tool industry's situation.

"Ordinarily the industry will do an annual volume of about $160,000,000. At present the volume is $350,000,000. On top of this the government is asking us to produce $200,000,000 more of equipment.

"We can do it and do it efficiently and rapidly. I don't say we could do much more, but we can handle the program as it is outlined."

Mr. Dunbar said his company's production at present is double the highest rate of any previous period. The management last week authorized a further 25 per cent increase in operations to be effected by increasing personnel on two night shifts.

Machine tool builders—like many other manufacturers—are awaiting details of the defense program. The government has outlined in general terms what it is going to need from the machine tool industry and details are in process of being worked out.

"For instance," said Mr. Dunbar, "the government has indicated it will want $30,000,000 worth of grinding machines and $40,000,000 worth of lathes and so forth, but it hasn't broken these figures down into types and quantities wanted. As soon as this is done the industry can go to work.

"Each plant will manufacture the equipment it normally produces."

Another factor to be straightened out, according to Mr. Dunbar, is the matter of order priority. The government wants to do as little as possible to interfere with orders from England and France. These orders and those for the United States government are expected to get priority, while the normal sources, and orders from Russia and Japan, will have to take their chances on delivery.

A further breakdown for priority of orders within the program for this country's defense is likely. Some equipment will be needed for specific purposes quicker than for other lines. For example, machines needed for aviation industry may be given priority over machines designed for government arsenals or navy yards.

CONGRESS SENDS THREE DEFENSE BILLS TO PRESIDENT

WASHINGTON

Congressional action was completed last week on three major preparedness bills, including the $1,821,853,222 army appropriation bill. A $655,000,000 authorization bill for the expansion of the navy by 11 per cent and a $2,200,000,000 measure to authorize a naval air force of 10,000 planes including 16,000 pilots and a chain of bases, were approved. The bills were sent to the White House for the President's signature. Later Mr. Roosevelt announced he had signed the army appropriations bill,

Senate joint resolution 274 was introduced last week by Senator Walsh, Massachusetts, chairman, naval affairs committee, dealing with acquisition of machine tools and other similar equipment. The joint resolution has been referred to the senate naval affairs committee and is expected to be favorably reported soon.

It provides: "That the President is authorized, through the secretary of war or the secretary of the navy, to enter into contracts, with or without advertising or competitive bidding, for the acquisition of machine

(*Please turn to Page* 32)

Manganese Ore Shipments To United States Interrupted

■ MOST of this country's imports from the Mediterranean and Balkan countries have been foodstuffs and tobacco and their cessation is not expected to create any great hardships here. Some chrome ore has been imported from Turkey. Mercury has been obtained from Spain and Italy.

More serious is the closing of the Mediterranean to imports of manganese ore from Russia, our leading supplier. Shipments from India have been going around the Cape of Good Hope for the past several weeks, but little has arrived in this country as Great Britain has been tightening the lines on her own supply. South African manganese ore is still available here, but its continuance is doubtful. Greater dependence on Cuban, South American and domestic ore was forecast by leading importers last week. For details of the ore market see page 102.

WHAT ITALY'S ENTRANCE MEANS TO U. S. TRADE

Italy's entrance into the war and the consequent extension of the United States neutrality act to include the Mediterranean closed to American shipping an important machinery and automotive market and a lesser iron and steel market.

Total trade with Italy and the other countries affected has amounted to $315,000,000 annually. Exports to that area have exceeded imports by about $10,000,000. The Mediterranean and Balkan countries have taken about 5 per cent of United States' total exports and have supplied 7 per cent of our imports.

Last year the United States exported to these countries: $14,200,000 worth of machinery; $10,900,000 worth of automotive equipment; $2,000,000 of electrical equipment.

Second largest (to Japan) importer of iron and steel scrap from the United States, Italy has taken 2,252,279 gross tons in the past seven years. Last year's 425,893 tons were 70 per cent of the country's import requirements. In the first three months this year, Italy purchased 129,586 tons of American scrap. An order for 250,000 tons placed several weeks ago is not expected to be delivered.

Other iron and steel imports by Italy have not been large. Most important have been pig iron, ferroalloys and sheets and tin plate. In 1939, pig iron shipments were 5240 tons; in 1938, 6672 tons; in 1937, 10,003 tons, and in 1936, 105 tons. Italy bought 2479 tons of sheets and tin plate here in 1938; 11,994 tons in 1937; and 1668 tons in 1936. United States exports of other finished steel products to Italy have been negligible.

Machinery and automobile exports have ranged from about $5,000,000 to nearly $8,000,000 during the past several years. Metalworking and agricultural machinery have been the leading classifications purchased, although oil well drilling and refining equipment, business machines and aircraft have been in considerable demand.

Affects Trade With 11 Other Nations

Total shipments to Italy last year were $58,864,000, just under 2 per cent of all our exports. Sixty per cent of the exports to Italy were cotton, petroleum and iron and steel products. Imports from Italy amounted to $39,922,000, mainly food and textile products.

United States trade with 11 other countries will be affected directly by war in the Mediterranean. Sales to them last year totaled $55,000,000 and imports from them about $70,000,000. A trade analysis for 1939:

Country:	Exports	Imports
Yugoslavia ..	$2,978,000	$5,503,000
Greece	6,390,000	22,358,000
Turkey	8,313,000	19,831,000
Syria	3,061,000	2,950,000
Palestine	7,646,000	639,000
Egypt	13,980,000	7,023,000
Tunisia	1,029,000	764,000
Algeria	2,055,000	2,029,000
Hungary	2,695,000	4,222,931
Bulgaria	1,150,000	2,815,469
Rumania	6,233,000	2,386,000

A large share of the purchases by these countries in the United States have been machinery and automobiles. For example, in 1939, Palestine bought $4,567,875 worth of machinery here, more than half her total imports. Egypt imported $4,212,000 of United States machinery; Greece took $2,000,000 worth; Turkey, $1,970,000; Rumania, $1,958,000.

Agricultural implements comprise bulk of United States sales to these Mediterranean and Balkan countries, followed by automotive, petroleum, roadbuilding and mining and quarrying machinery in the order named.

Iron and steel exports to these countries were relatively modest. Leading customer last year was Greece with 9439 tons, including scrap and alloys. In second place was Rumania with 6228 tons, followed by Yugoslavia with 2500 tons, Turkey with 1166 tons and Egypt with 1140 tons.

MEETINGS

FUTURE FOR COAL WILL BE CONFERENCE TOPIC

■ Fuel engineering division of Appalachian Coals Inc., Cincinnati, will sponsor its twenty-sixth fuel engineering conference at the Shoreham hotel, Washington, June 21. Addresses at morning and afternoon sessions, a luncheon and dinner, will be keyed to the theme, "What the Future Holds for Coal and Its Utilization." Assistant Secretary of War, Louis D. Johnson will speak at the dinner on "National Defense and Industry."

AGRICULTURAL ENGINEERS TO DISCUSS METALS ON FARMS

American Society of Agricultural Engineers will conduct its thirty-fourth annual meeting at Pennsylvania State college, State College, Pa., June 17-20. Several items for discussions are of interest to the steel and metalworking industries.

To be considered by the farm structures division will be: "Progress in Formulating Construction Standards and Specifications for Farm Buildings," by G. B. Hanson, chairman, committee on specifications for building materials; "Engineering Problems in Prefabricated Structural Farm Equipment," by D. H. Malcom, chairman, committee on prefabricating structural farm equipment; "Progress Report on Fence Testing Project," by J. W. Crofoot, representative on A.S.T.M. committee A-5 on corrosion of iron and steel; "Co-operation of Industry and Government in Advancement of Rural Housing and Farm Building," by Dr. M. L. Wilson, director of extension, United States department of agriculture.

Dr. John Lee Coulter, consulting economist, Washington will speak on "The Economics of Farm Machinery." Power and machinery division lists the following papers: "Flow Lines in Forgings for Farm Machines," by J. Roberts, instructor in agricultural engineering, Kansas State college; "Role of Nickel in Production of Farm Tools," by H. L. Geiger, development and research division, International Nickel Co. Inc.; "Farm Machinery Design—A Critical Appreciation of American Methods," by Wilhelm Vutz, engineering department, New Idea Inc.

Thousand Planes a Day "Simple", Says Ford; Ready for Contract

DETROIT

■ THREE weeks ago in these pages it was stated that a "fairly complete upheaval in present concepts of what an airplane is and how much it is to cost . . . is only a matter of weeks." Last week at the Ford airport came the first inklings of confirmation of this report.

Henry Ford, in company with the purchasing and production brains of his vast Rouge plant, A. M. Wibel and C. E. Sorenson, climbed over a P-40 type pursuit plane of the latest design, sent by the war department for inspection. After a preliminary examination, the latter two, with Edsel Ford, left for Washington to confer with George Jackson Mead, aircraft engine authority now in service of the government.

At the airport Henry Ford referred to the production of 1000 planes a day as a "simple" matter; in Washington, young Ford stated his company was ready to swing into mass production as soon as the government awarded it contracts.

The Fords revealed that for five months the company has been working on a new 1000-horsepower engine, considerably simplified over present engine designs.

Given a standardized design, the Ford plant would have no difficulty in rolling out 1000 such motors a day, without even seriously interfering with car production. A few changes in fuselage construction, such as the use of welding instead of setting by hand thousands of rivets, would adapt wings and fuselages to assembly lines. The Ford officials suggested that in many respects the production of an airplane is a simpler matter than turning out an automobile.

These were ominous words for the nation's established aircraft builders. If Ford is getting set to go on airplanes—and at this stage every indication points to the fact that such a development is in the making—look for plane costs to go tumbling, just as automobile costs went tumbling with the Model T. Several decades hence historians may look at pictures of Henry Ford peering beneath the cowling of the P-40 and say: "There was the birth of the latest great revolution in transportation."

No credit is taken from the many invaluable contributions to aircraft manufacture which present builders have pioneered. Douglas, Boeing, Consolidated, North American and others have done and are doing commendable work in furtherance of aviation. But when it comes to mass output of flying power, they would not be in the picture with Ford, if he proceeds as indicated.

To show why costs of present airplanes are high, in automotive sense, consider the case of one large manufacturer buying an alloy steel screw used only for assembly purposes and not in the finished plane. It is stipulated that these screws must be of S.A.E. 2330 steel, given a 10 per cent magnaflux inspection, and they must even be centerless ground to remove the "bulge" in the top thread resulting from rolling the threads. As a result of this careful control and inspection the screws cost the buyer around $45 per thousand, compared with similar screws used by the auto industry costing $3.50 per thousand.

However, it is almost dangerous to talk about automotive practice to aircraft buyers, some of whom frankly refer to automobile production men as "butchers."

Reports concerning low cost of German planes are heard frequently. It is said on good authority that large numbers of Nazi craft do not even carry instruments, the pilots being required to keep in formation by sighting on a squadron leader and maneuvering largely "by the seat of their pants."

Instrumentation is a costly item in aircraft, taking time and money to install and calibrate. Considerable simplification may be possible on this score, particularly in fighting planes where the hazards of destruction are high.

Birth of New Era in Transportation?

Detroit News Photo

■ **When Henry Ford looked over the Curtiss P-40 pursuit plane sent to Detroit last week by the war department for his inspection, with a view to mass production, Ford reiterated his statement he could build 1000 planes a day. Son Edsel said that in an emergency his company might produce 5000 a day. With the Fords rising to the challenge, observers were remarking the incident might mark the beginning of "another revolution in transportation." Standing on wing and peering into cockpit, left to right are: Edsel; Charles E. Sorenson, Ford production manager; Major Paul Kemmer, Wright Field, Dayton, O., and Henry Ford**

Says Carbide Tools Help England Double Output

■ Great increase in use of cemented carbide tools in Great Britain for machining shell forgings and war materials is reported by Arthur H. Alexander, now in this country representing George H. Alexander Machinery Ltd., Birmingham, England, Kennametal licensee.

Where there was a delay in obtaining additional manufacturing facilities to make war goods, production on existing machines in some instances was increased as much as 100 per cent by tooling with carbide tools, said Mr. Alexander.

The company has completed plans for the erection of two additional plants in England for making carbide tools.

Canada To Build More Munitions Plants: Adopts U. S.-Type Planes

TORONTO, ONT.

■ CANADA, attempting to speed further its war *materiel* production will start immediately to construct two munitions plants to cost $20,000,000. One will produce nitrocellulose and will be a joint undertaking by France and Canada. The other will be a shell filling plant sponsored by Great Britain and Canada. Contract for construction of the shell filling plant has been awarded to Canadian Car & Foundry Co. Ltd., Montreal.

These are in addition to two explosives plants nearing completion.

Additions to expand capacity of existing plants have been speeded up and others are being projected by a variety of companies throughout the dominion.

With Great Britain practically closed to Canada as a source for airplane engines and parts, Canadian companies are planning to manufacture United States-type planes. Import duties on engines and parts from the United States, as well as fire-brick for blast furnaces, may be eliminated, according to reports from Ottawa.

British-type aircraft production by Canadian Associated Aircraft Ltd., composed of six companies with assembly plants at Malton, Ont., and near Montreal, is practically at a standstill as result of inability to obtain engines and parts from England. Associated Aircraft has a backlog of between $40,000,000 and $50,000,000. Orders on hand include 80 Hampden bombers to cost about $10,000,000 and 130 Stirlings, large 4-engined ships, to cost between $30,000,000 and $40,000,000. American-type planes may be substituted for these.

To Start Tank Mass Production

Associated Aircraft was organized late in 1938 and includes Canadian Car & Foundry Co., Fairchild Aircraft Ltd., and Canadian Vickers Ltd., Montreal; National Steel Car Corp., Hamilton, Ont.; Ottawa Car & Aircraft Ltd., Ottawa; and Fleet Aircraft Ltd., Fort Erie, Ont.

Canada soon will start large scale tank production. An order for three hundred 40-ton tanks carrying 4-inch armor plate has been awarded by the British government. Steel for their construction is not available in Canada and will be imported, presumably from the United States.

Department of munitions and supply, Ottawa, has awarded contracts to the value of $13,000,000 for construction of new type military motor vehicles. The chassis and engines will be produced by Ford Motor Co. of Canada Ltd., Windsor, Ont., and General Motors Products of Canada Ltd., Oshawa, Ont.

This is in addition to the $13,600,000 order placed last March and which will be completed this month.

The Canadian automobile industry already is geared to produce 60,000 pieces of mechanized military equipment per year, and this production can be substantially increased.

Auto Plants Make Carriers

Although it is not possible for the Canadian automobile industry to manufacture tanks or heavy armored fighting equipment at present, the production of gun carriers, trucks and other vehicles is possible on a large scale. Since April 1, nearly 7000 pieces of motorized equipment for the Canadian armed forces have been manufactured and delivered by Ford Motor Co. of Canada, and General Motors Products of Canada.

Department of munitions and supply last week placed contracts with total value of $11,872,710. Most important items were for mechanical transport and aircraft supplies. Three United States companies participated in orders of the week. Following are the larger contracts:

Mechanical transport—Ford Motor Co. of Canada Ltd., $4,648,437; General Motors Products of Canada, $4,440,294; Pierre Thibault, Pierreville, Que., $5184; Scythes & Co. Ltd., Montreal, $19,563; Canadian National Railway Co., Montreal, $10,300; The Thew Shovel Co., Lorain, O., $20,313.

Aircraft supplies—Canadian Pratt & Whitney Aircraft Ltd., Longueuil, Que., $564,891; Walter Kidde & Co., Montreal, $48,130; Noorduyn Aviation Ltd., Montreal, $47,403; Canadian Vickers, Ltd., Montreal, $31,585; LaFrance Fire Engine & Foamite Co. Ltd., Toronto, $85,308; Pyrene Mfg. Co. Ltd., Toronto, $46,950; Wells Air Harbour, Vancouver, B. C., $7112.

Machinery, tools—Stanley Tool Co. of Canada Ltd., Roxton Pond, Que., $12,200; Builders' Sales Ltd., Ottawa, $10,398.

Ordnance—Auto Ordnance Corp., New York, $35,462; Colt Patent Fire Arms Co., Hartford, Conn., $45,331; Accessories Mfg. Ltd., Montreal, $7008; British air ministry, $47,034; British war office, $13,670.

Of the total value of contracts placed by the department of munitions and supply and its predecessors since July 14 last, less than 3 per cent was placed in the United States. Of the total contracts amounting to over $193,000,000 placed to the end of April, $5,500,000 were placed in the United States.

Dominion Rushes Sub Chaser Construction

■ **Engaged in building $50,000,000 worth of war vessels and submarine chasers for the Allies. Canada is facing one of the greatest steelworks and shipbuilding expansions in her history. Overnight she has had to put shipbuilding on a production basis. Here is a huge bedplate for the main engine of a submarine chaser moving down the line in a Montreal shipyard. NEA Photo**

Steel Corp. Shipments Up 19.4 Per Cent in May

■ United States Steel Corp. finished steel shipments in May were 1,084,057 net tons, an increase of 176,153 net tons, 19.4 per cent, over 907,904 tons shipped in April and 288,368 tons greater than May shipments last year. For five months ended May 31 shipments totaled 5,078,714 tons, compared with 4,030,842 tons in the first five months of 1939.

(Inter-company shipments not included)

Net Tons

	1940	1939	1938	1937
Jan.	1,145,592	870,866	570,264	1,268,403
Feb.	1,009,256	747,427	522,395	1,252,845
March	931,905	845,108	627,047	1,563,113
April	907,904	771,752	550,551	1,485,231
May	1,084,057	795,689	509,811	1,443,477
June	.....	807,562	524,994	1,405,078
July	.....	745,364	484,611	1,315,353
Aug.	.....	885,636	615,521	1,225,907
Sept.	.....	1,086,683	635,645	1,161,113
Oct.	.....	1,345,855	730,312	875,972
Nov.	.....	1,406,205	749,328	648,727
Dec.	.....	1,443,969	765,868	539,553
Total, by Months	.....	11,752,116	7,286,347	14,184,772
Adjustment	..	*44,865	†29,159	*87,106
Total	.....	11,707,251	7,315,506	14,097,666

†Increase. *Decrease.

Republic Steel Blows In 1000-Ton Blast Furnace

■ Republic Steel Corp. last Tuesday blew in its recently enlarged blast furnace in Cleveland. Completion of the work on this furnace, begun last March to increase capacity from 550 tons, gives the company two 1000-ton furnaces in Cleveland. The new furnace is 105 feet high.

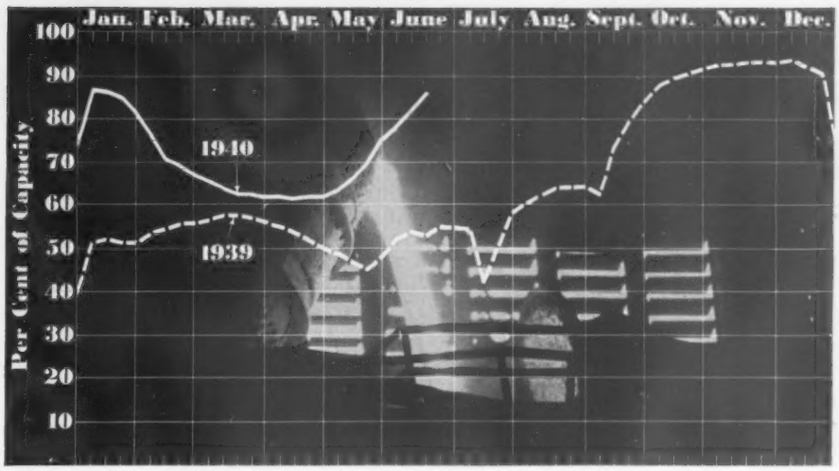
The company also has completed an expansion program at its Birmingham, Ala., blast furnaces which has increased capacity 35,000 tons a year.

North California Scrap Institute Chapter Formed

■ Establishment of a Pacific coast division of the Institute of Scrap Iron & Steel Inc. will be considered at the institute's midyear meeting at Buffalo, July 22-23, according to Edwin C. Barringer, executive secretary.

Pacific coast chapter, which heretofore included all of the California membership, has been divided into Northern and Southern California chapters. Temporary officers elected for the northern chapter are as follows: President, Marshall Shapiro, California Scrap Iron Co., Oakland; vice president, Phil Scheibner, Associated Iron & Metal Co., Oakland; secretary-treasurer, Henry Purdy, Hyman-Michaels Co., San Francisco. Temporary officers of the southern chapter were announced in STEEL, June 10, p.35.

Until the executive committee of these chapters are elected, P. W. Keen, Biddle Trade bureau, Los Angeles, secretary of the southern chapter, will act as liaison between California members and institute headquarters.



PRODUCTION... Up

■ STEELWORKS operations last week advanced 4½ points to 86 per cent. Ten districts increased their rate and two were unchanged. Last year the rate was 52½ per cent; two years ago it was 27 per cent.

Detroit—Up 20 points to 95 per cent, with 24 of 26 open hearths in production.

Cincinnati—Rose 6 points to 76 per cent as mills seek to complete low-priced sheet deliveries this month.

Buffalo—Gained 6 points to 90 per cent, one additional open hearth being lighted.

Youngstown, O. — Advanced 3 points to 70 per cent as three open hearths were added. Three bessemers and 63 open hearths are in service. For this week the schedule indicates 2 points higher.

Birmingham, Ala.—Increased 3 points to 88 per cent, with 21 open hearths in production.

Chicago—Up 5½ points to 91½ per cent, to second highest rate of the year. Further small gains are in prospect.

Central eastern seaboard—Added 3 points, to 76 per cent, with further rise probable this week.

New England—Unchanged at 66 per cent.

Pittsburgh — Net increase of 1 point to 81 per cent resulted from several mill changes.

Wheeling—Resumption of an idle plant and increases at active plants made the rate 90 per cent, up 11 points.

Cleveland—Steady at 82 per cent as mills push production.

St. Louis—Enlarged output 12 points to 68 per cent, 16 of 28 open hearths being active.

Gear Sales in May Increase 3.9 Per Cent

■ Gear sales in May were 3.9 per cent above April this year and 43 per cent over May, 1939, according to American Gear Manufacturers association, Wilkinsburg, Pa. Sales for five months this year were 33 per cent greater than for the same period in 1939. Comparative index figures follow:

	1940	1939
January	123	91
February	116	86
March	114	104
April	128	88
May	133	93

■ Allegheny Ludlum Steel Corp. recently rolled a 29-gage silicon steel sheet 64 x 64 inches at its Brackenridge, Pa. plant. The company reports this is the largest silicon sheet ever rolled.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended June 15	Change	Same week 1939	1938
Pittsburgh	81	+ 1	40	23.3
Chicago	91.5	+ 5.5	49.5	22
Eastern Pa.	76	+ 3	37	26
Youngstown	70	+ 3	52	27
Wheeling	90	+11	73	35
Cleveland	82	None	55.5	31
Buffalo	90	+ 6	44	28
Birmingham	88	+ 3	71	58
New England	66	None	40	25
Cincinnati	76	+ 6	73	28
St. Louis	68	+12	42	39.3
Detroit	95	+20	57	21
Average	86	+ 4.5	52.5	27

Lower Unemployment Tax Rate "Depends on Management"

■ MANUFACTURERS currently subject to unemployment compensation tax rates higher than the minimum should seek the remedy to their problem within their own organization, according to Clarence B. Bartlett, industrial analyst and managing director, Industrial Co-ordinators Inc., Cleveland.

Basing his assertion on statistics recently published in the social security board's Employment Security Memorandum No. 6, covering 1938, Mr. Bartlett stated last week that if employment in an industry as a whole varied less than 10 per cent throughout the year there was no valid reason for individual companies in that industry to have a variant as great as 40 per cent in the same period. He believes management, properly co-ordinated, could overcome tendencies which make for wide variations in employment.

Citing the security board's figures for the iron and steel industry in Ohio, which he said may be considered typical of the entire industry, he pointed out monthly employment that year varied less than 6 per cent from the average. Nevertheless, there were iron and steel manufacturers in Ohio whose employment variant was several times as great, resulting in considerably larger unemployment compensation tax payments than was indicated by the industry's record.

Various methods have been devised by manufacturers in an effort to stabilize employment. In certain cases, however, Mr. Bartlett said, the preventive measures adopted have proved considerably less efficient and more expensive than anticipated. Consequently employment stabilization proved more costly than higher tax rates.

Machinery builders, exclusive of electrical equipment manufacturers, in Ohio had an average monthly employment of 77,597 in 1938. Greatest variation from the average was slightly more than 9 per cent. Wages for the same industry, on a quarterly basis, varied less.

Referring again to Ohio as a representative industrial state, Mr. Bartlett said it had built up, to Jan. 1, 1940, an unemployment compensation balance exceeding $133,000,000, which is nearly 15 per cent of the state's total annual industrial payroll. With such a fund already established, he declared, industry under sound management should be able to maintain a fund in excess of 15 per cent of Ohio industries' annual payroll.

More than 50 per cent of Wisconsin's employers have already had their unemployment tax compensation rates reduced, due to increasing reserve funds, despite considerable variations in industrial activity in recent years. What manufacturers in Wisconsin have done, said Mr. Bartlett, those elsewhere can do.

Among specific recommendations for employment stabilization he listed: "Development of new products; avoidance of rush orders; control of fluctuations in inventory; stimulation of off-season demands; and development of systems of transfer of employes between the departments and plants; and along with this, the training of employes for greater versatility of work."

STEEL THIRD LOWEST IN NUMBER OF STRIKES

Iron and steel industry, in 1939, ranked third lowest among the principal manufacturing industries in number of strikes, workers involved and total man-days idle. Labor department's statistics bureau reports iron and steel manufacturers had a total of 57 strikes last year, involving 14,500 employes. Man-days idle aggregated 212,800, an average of 14.7 days per employe. Major strikes in 1939:

Industry	No. of strikes	Workers involved
All industries	2,613	1,171,000
Manufacturing:		
Textiles and clothing	539	90,700
Lumber and products	170	31,100
Foodstuffs	148	29,600
Machinery and products	85	25,000
Paper and printing	58	5,100
Iron and steel	57	14,500
Transportation equipment	56	133,600
Stone, clay and glass	53	11,400
Other manufacturing industries	223	53,200
Nonmanufacturing:		
Building and construction	320	70,100
Wholesale and retail trade	283	26,200
Transportation, communication	252	86,600

170 Iron, Steel Consumers Report $85,943,600 First Quarter Net Profit

■ AGGREGATE net income earned during first 1940 quarter by 170 iron and steel consumers totaled $85,943,600, compared to $42,981,168 net profit reported by the same companies in corresponding 1939 period. Only 14 reported a net deficit for the period, compared to 44 in last year's first quarter. Fifty-one companies are listed below; previous issues of STEEL included 119. Figures are net earnings; asterisk denotes loss:

	First 1940 Quarter	First 1939 Quarter
Allied Products Corp., Detroit	$37,800	$12,771*
Allis-Chalmers Mfg. Co., Milwaukee	969,869	710,277
American Machine & Metals Inc., New York	18,476*	66,077*
American Safety Razor Corp., Brooklyn, N. Y.	136,072	206,673
American Wire Fabrics Corp., New York	262,701*	158,753*
Bendix Aviation Corp., South Bend, Ind.	1,933,880	1,023,996
Black & Decker Mfg. Co., Towson, Md.†	194,325	137,425
Briggs Mfg. Co., Detroit	2,395,202	958,047
Chapman Valve Mfg. Co., Indian Orchard, Mass.	156,492	23,546
Checker Cab Mfg. Corp., Kalamazoo, Mich.	109,254*	80,982*
Chicago Pneumatic Tool Co., New York	356,834	185,219
Douglas Aircraft Co. Inc., Santa Monica, Calif.†§	1,804,877	771,522
Fairchild Aviation Corp., Jamaica, L. I.	209,012	56,255
Gabriel Co., Cleveland	13,249*	6,722*
Gar Wood Industries, Detroit	86,228	6,928*
Graham-Paige Motors Corp., Detroit	320,842*	352,022*
Hercules Motors Corp., Canton, O.	187,753	124,024
Holland Furnace Co., Holland, Mich.	119,241*	158,644*
Hudson Motor Car Co., Detroit	854,245*	874,784*
Hydraulic Press Mfg. Co., Mt. Gilead, O.	62,741	47,671
Industrial Brownhoist Corp., Bay City, Mich.	51,431	22,231*
Joslyn Mfg. & Supply Co., Chicago	198,594	132,080
Mack Trucks Inc., Long Island City, N. Y.	111,448	94,869*
Marlin-Rockwell Corp., Jamestown, N. Y.	719,735	219,988
Martin Co., Glenn L.; Baltimore	2,162,670	682,496
Micromatic Hone Corp., Detroit	56,987	15,273
Monarch Machine Tool Co., Sidney, O.	302,559	173,783§
Motor Wheel Corp., Lansing, Mich.	614,208	420,405
Myers & Bros. Co., F. E.; Ashland, O.§‡	233,489	196,471
National Supply Co., Pittsburgh	426,228	232,980*
North American Aviation Inc., Inglewood, Calif.	$520,659	$1,355,952
Packard Motor Car Co., Detroit	38,409	230,329
Pullman Inc., Chicago	2,655,816	735,764
Reed Roller Bit Co., Houston, Tex.	307,188‡	406,445‡
Remington Rand Inc., Buffalo‡†	2,232,000	1,750,391
Reynolds Spring Co., Jackson, Mich.	322,251	71,700
Rheem Mfg. Co., Richmond, Calif.	176,277	90,780
Royal Typewriter Co., New York§‡	572,667	520,187
Servel Inc., Evansville, Ind.§‡	692,890	836,226
Smith & Corona Typewriters Inc., L. C.; Syracuse, N. Y.	123,169	117,664
Terre Haute Malleable & Mfg. Corp., Terre Haute, Ind.	8,682	8,996
Thompson Products Inc., Cleveland	522,168	325,156
Timken Roller Bearing Co., Canton, O.	2,887,518	1,907,393
Universal-Cyclops Steel Corp., Bridgeville, Pa.	411,713	171,523
Van Norman Machine Tool Co., Springfield, Mass.	105,868	58,565
Walworth Co., New York	69,678	48,368*
Waukesha Motor Co., Waukesha, Wis.†	289,145	84,083
Weston Electrical Instrument Corp., Newark, N. J.	284,120	52,806
White Sewing Machine Corp., Cleveland	135,638	113,017
Worthington Pump & Machinery Corp., Harrison, N. J.	552,805	214,490*
Young Spring & Wire Corp., L. A.; Detroit	332,384	109,355

†Indicated net profit; ‡before federal income taxes; §six months to June 30; †§fiscal year ends Feb. 29; ‡†preliminary consolidated earnings; §‡quarter ends April 30.

Electroplaters Spur Progress: Recognize Meritorious Research

■ PROGRESS in all phases of the art of electroplating was reported at the twenty-eighth annual convention of the American Electroplaters' society at the Biltmore hotel, Dayton, O., June 10-13. Host to the convention was the Dayton branch, which just 25 years ago had sponsored the society's third annual meeting. With an attendance of 610 members and guests, an all-time record was established.

The week's program embraced two business sessions, six educational sessions with 24 technical papers, one afternoon of plant visitations, another afternoon devoted to an outing, the annual banquet, and numerous other social events.

Technical papers, authorized by the country's experts in metal plating, ran from discussions of shop problems to highly complicated researches, and included consideration of cleaning and pickling, polishing, and testing of coatings, in addition to the electroplating process proper.

Throughout the week, the society conducted an extensive exhibit of electroplated products, this made up of displays arranged by the organization's 30 branches. This served a most useful purpose of indicating the widespread use of plating as to product and the various finishes which are available.

Papers Win Honors

Medals and awards were announced by the society as follows:

Founders Gold medal, to Frank C. Mesle, Oneida Ltd., Oneida, N. Y., for the paper, "Adhesion of Electrodeposits," presented at the Asbury Park, N. J., convention in 1939.

A. E. S. Gold medal, to Dr. A. Kenneth Graham, consulting engineer, A. Kenneth Graham & Associates, Jenkintown, Pa., and Dr. Harold J. Read, instructor in electrochemistry, University of Pennsylvania, Philadelphia, for the paper, "A Study of Electrolyte Films," presented at the 1939 convention.

Samuel Heunerfauth cup, to the New York branch, for the paper, "Studies in Bright Nickel Plating Processes," by Dr. C. B. F. Young, electrometallurgist, Columbia university, New York, presented at the 1940 convention.

Proctor Memorial award of $100, to Carl A. Zapffe, research associate, and C. L. Faust, research engineer, Battelle Memorial institute, Columbus, O., for the paper, "Metallurgical Aspects of Hydrogen in Electroplating," presented at the 1940 convention.

Honorable mention for the Proctor award to A. Brenner, national bureau of standards, Washington, for the paper, "A New Method for Studying Cathode Films" and Walter L. Pinner, chemical engineer, General Spring Bumper division, Houdaille-Hershey Corp., Detroit, for the paper, "A Short Research on the Effect of Basis Metal Polishing on the Character of Nickel Plate." Both papers were presented at the 1940 convention.

A $50 award, newly established and for the best paper published in the society's *Monthly Review*, to E. A. Anderson and C. E. Reinhard, metal section, research division, New Jersey Zinc Co., Palmerton, Pa., for the paper, "Alkaline Cleaning and Copper Blistering," appearing in the March, 1940, issue.

Frederick Fulforth, in charge of plating and polishing dpartments, Proctor Electric Co., Philadelphia, was elected president of the society to succeed R. M. Goodsell, secretary-treasurer, Racine Plating Co., Racine, Wis.

Ellsworth Candee, technical supervisor, American Metal Hose branch, American Brass Co., Waterbury, Conn., was named first vice president; Nelson F. Sievering, in charge of plating operations and director of laboratory, Philip Sievering Inc., New York, second vice president; and John C. Conley, manager, Sidney, O., plant, Stolle Corp., third vice president.

W. J. R. Kennedy, 93 Oak Grove avenue, Springfield, Mass., was reappointed executive secretary.

It was announced by the research committee that Gerald A. Lux, Lustre Chemical Corp., Rochester, N. Y., had been appointed research associate and shortly would undertake work at the national bureau of standards, Washington.

By action of the convention, the names of two long-time members, recently deceased, were added to the list of honorary members. They were Fred Liscomb, associated with the Chicago office, Hanson-Van Winkle-Munning Co.; and Oliver J. Sizelove, associated with the Frederick Gumm Chemical Co. Inc., Kearny, N. J.

The convention in June, 1941, will be held in Boston.

■ Norton Co., Worcester, Mass., presented 10 and 15-year certificates and emblems to 203 employes June 12. Employes were addressed by A. C. Higgins, president; George N. Jepson, vice president and treasurer, and Charles L. Allen, chairman and one of the original founders of the company in 1885. Mr. Allen was general manager for 47 years. Norton has been presenting service certificates, emblems and medals for 10, 15 and 25-years' service for a period of 18 years. Over 25 awards have been made.

Officers Elected by Automobile Association

■ Alvan Macauley, chairman of the board, Packard Motor Car Co., Detroit, was re-elected president of the Automobile Manufacturers association at its annual meeting in Detroit last Wednesday.

Other officers re-elected for one-year terms include: Alfred P. Sloan Jr., General Motors Corp., first vice president; Paul G. Hoffman, Studebaker Corp., vice president, passenger car division; Robert F. Black, White Motor Co., vice president, commercial car division; Pyke Johnson, executive vice president; Alfred Reeves, advisory vice president; and Byron C. Foy, DeSoto division, Chrysler Corp., secretary.

George W. Mason, Nash-Kelvinator Corp., was elected treasurer to fill the office held by the late Frederick J. Haynes.

The association also re-elected four directors to three-year terms: Alfred P. Sloan Jr., Byron C. Foy, Charles W. Nash, Nash-Kelvinator Corp., and A. E. Barit, Hudson Motor Car Co.

Dudley Willcox Dies

■ Dudley Willcox, treasurer and assistant general manager, Ajax Electrothermic Corp., Trenton, N. J., died June 14 at the Princeton, N. J., hospital, as result of complications following an appendicitis operation.

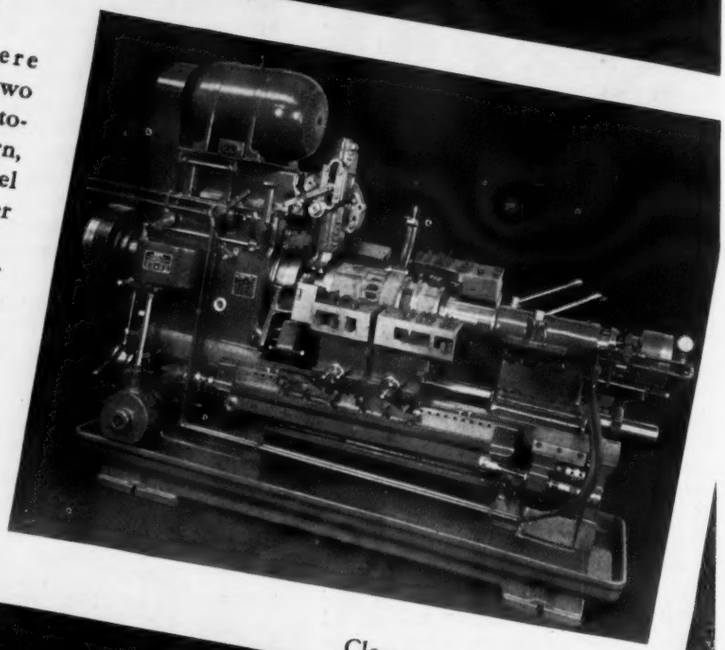
Mr. Willcox was born July 21, 1886, in Lowell, Mass. He attended Lawrenceville academy and was graduated from Yale university in 1908. From then until 1914 he was associated with the Tabor Mfg. Co., representing that firm in Europe during 1911-1912. In 1916 he completed a graduate course at Princeton university, and was awarded the degree of electrical engineering.

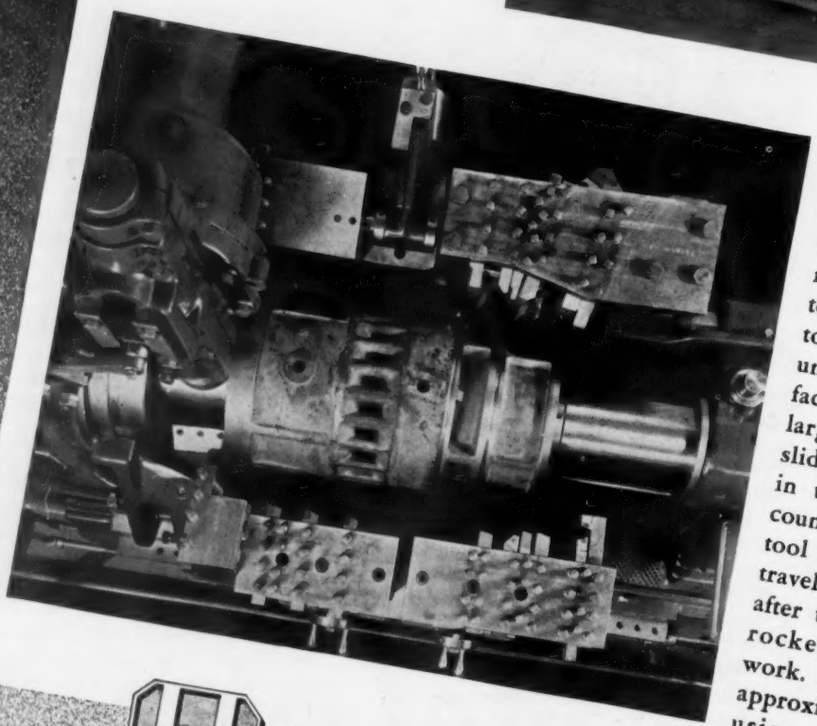
While at Princeton he met the late Dr. Edwin S. Northrup, and with him and others organized the Pyro-electric Instrument Co., and was treasurer when the company was succeeded by the Ajax corporation. He became its first secretary and sales manager in 1920, and later treasurer and assistant general manager.

HOURS *reduced to* minutes!

Production Hours were reduced to Minutes when two Jones & Lamson Fay Automatic Lathes were used to turn, face and form this Diesel Engine cast-iron cylinder liner in two operations.

Perhaps we can make similar savings for you. Jones & Lamson Engineers are always ready to study your problems, with no obligation, and demonstrate the investment value of Fay Automatic Lathes.





Close view of tooling with work in position. The carriage turns the O. D. while the back-arm faces, chamfers and forms. An auxiliary slide under the back-arm tool block carries two tools to form the semi-circular undercuts. An auxiliary arm faces the counterbore in the large end and the overhead slide cuts the spiral groove in this counterbore. The counterbore is sized by a tool on the carriage that travels toward the tailstock after the other tools have rocked away from the work. Floor to floor time approximately 7 minutes, using cemented carbide tipped tools.

J&L

JONES & LAMSON MACHINE COMPANY

SPRINGFIELD, VERMONT, U. S. A.

MANUFACTURERS OF: SADDLE & RAM TYPE UNIVERSAL TURRET LATHES . . . FAY AUTOMATIC LATHES . . . AUTOMATIC DOUBLE-END MILLING & CENTERING MACHINES . . . AUTOMATIC THREAD GRINDING MACHINES . . . COMPARATORS . . . TANGENT AND RADIAL, STATIONARY AND REVOLVING DIES AND CHASERS

Windows of *WASHINGTON*

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ AMENDMENTS to national labor relations board act, which passed house by a two-to-one vote, will not be acted on in senate unless congress remains in session longer than is anticipated.

Senator Thomas, Utah, senate labor committee chairman, said it would be impossible to get action on the amendments if leaders carry out their plans to have congress adjourn June 22. Even if congress does not adjourn at that time it is very doubtful the amendments will soon be taken up in senate.

Meanwhile H. W. Prentis, president, National Association of Manufacturers, urged congress take up the matter before adjournment.

House vote indicates, he said, the nation wants action on the Wagner act now.

Abolishes Board's Economic Division

Bill which passed house called for abolition of present labor board and creation of a new three-man agency, but would permit President Roosevelt to reappoint the present board. It also separates board's present judicial and prosecution functions, leaving former with the board and providing an administrator for all other activities. Permission is granted employers to discuss labor conditions with their workers, providing such conversations are not accompanied by threats of coercion or discrimination.

Labor relations board is forbidden, by the bill, to order reinstatement of any worker who willfully engaged in violence or unlawful destruction or seizure of property. It further requires the board to obtain workers' affirmative approval before ordering a craft union to join an industrial union for collective bargaining purposes.

Bill also limits for one year both period for which board could order back pay and period in which charges of act's violation might be filed. Further, it abolishes board's economic division and allows employers to refuse to bargain with alien labor representatives.

PLANS CO-ORDINATION TO SPEED UP DEFENSE PROGRAM

Department of labor is forming plans for co-operation with other government agencies, management and labor to develop latter's maximum efficiency in speeding up defense program, Secretary Perkins reported last week. Departmental officials will confer regularly with those of other agencies and with representatives of labor and industry, she said, in co-operative efforts to carry through preparedness plans.

"Importance of adequate standards concerning physical conditions of work places for safety and health should be emphasized in the large-scale operations ahead," Secretary Perkins said. "Adequate safety devices and proper lighting, ventilation and sanitation will be needed to conserve our man-power in plant and factory.

"In efforts to conserve productive man-power for essential industries under the heavy pressure of the preparedness program, we shall need a wide-spread plan for preventing the losses due to industrial illness and accidents. We should recognize that the industrial worker, especially the skilled worker, is an important cog in the war machine, and further, that it is difficult to replace a skilled worker incapacitated from whatever cause."

LABOR DEPARTMENT PLANS INDUSTRIAL COST SURVEY

Labor and production costs in various manufacturing industries will be studied by labor statistics bureau, department of labor. President Roosevelt signed a resolution calling for this survey last week, following its passage by congress.

Between 1,500,000 and 2,000,000 men are unemployed, bureau has estimated, because of labor saving devices put into use since 1929. House labor committee contended cost statistics are necessary to "prevent technological unemployment."

APRIL IRON, STEEL ORDERS INCREASED 3.1 PER CENT

Value of April iron and steel shipments was 121.1, based on January, 1939, as 100, according to department of commerce. March total was 125.6; February, 133.3 and January, 137.

Increase in value of new orders from March to April was 3.1 per cent. Increase in March from February was 26.1 per cent but in February from January there was a decrease of 2.9 per cent and in January from December decrease was 27.2 per cent. April increase in value of orders over same month last year was 27.6 per cent.

Unfilled orders in April showed a decrease of 0.1 per cent from March; in March a decrease of 2.4 per cent from February; in February a decrease of 9.4 per cent from January; and in January a decrease of 8.1 per cent from December. However, April increase in unfilled orders from same month last year was 36.5 per cent.

April was first month since November, 1939, in which manufacturers' new orders exceeded shipments, according to the department.

Increase in orders arrested steady decline in unfilled order backlogs which had been a significant feature of the business situation since last fall. Value of unfilled orders on books of manufacturing concerns April 30 was 1 per cent higher than March 31. Incoming business was about 7 per cent greater than in March, while shipments remained practically unchanged.

Inventory holdings were reduced

in April by more than $100,000,000, or 1 per cent of total stocks in hands of manufacturers. Seasonal declines in certain industries were partly responsible for the decrease, but downward movement was present in most important industry groups.

April decline was considerably larger than March reduction of about $40,000,000 when inventory accumulation resulting from large volume of purchasing immediately following outbreak of war in Europe, terminated. Magnitude of inventory change in April, however, was considerably smaller than increases of $300,000,000 per month, registered in final 1939 quarter.

Armament News

(*Concluded from Page* 23)

tools and other equipment used in connection therewith required by the war department or the navy department for national-defense purposes. Delivery to the United States of any such tools or equipment shall, in the discretion of the President, take priority over deliveries to be made by the contractor for use outside the United States.

"Sec. 2. Any moneys heretofore appropriated for the war department and the navy department for national-defense purposes or which may hereafter be appropriated for such departments for such purposes (unless specifically excluded in the uses for which any such appropriation is available), shall be available for the acquisition of such tools or equipment.

"Sec. 3. This joint resolution shall terminate upon a proclamation by the President whenever he finds that the authority contained in this joint resolution is no longer necessary in the interest of the national defense.

"Sec. 4. Contracts negotiated pursuant to this joint resolution shall not be deemed to be contracts for the purchase of such materials, supplies, articles, or equipment as may usually be bought in the open market within the meaning of section 9 of the act entitled "An act to provide conditions for the purchase of supplies and the making of contracts by the United States, and for other purposes," approved June 30, 1936 (49 Stat. 2036; U. S. C., Supp. V, title 41, secs. 35-45.)."

PROPOSES PROHIBITION OF SCRAP EXPORTS

Representative Whelchel, Georgia, last week introduced a bill in the house (H.R. 10059) to provide for the protection and preservation of domestic sources of iron and steel.

The bill, which has been referred to the house ways and means committee follows:

"That, in the interest of national defense, it is hereby declared to be the policy of congress and the purpose and intent of this act to protect, preserve, and develop domestic sources of iron and steel, to restrain the depletion of domestic reserves of iron and steel scrap and to lessen the present danger of shortage of materials for the domestic iron and steel industry of the United States.

"Sec. 2. There shall not be exported from the United States after the expiration of 60 days from the enactment of this act any iron or steel scrap.

"Sec. 3. Any violations of the provisions of this act shall be a misdemeanor and shall be punished by a fine of not more than $500 or by imprisonment of not more than one year, or by both such fine and imprisonment."

SENATE EMPOWERS PRESIDENT TO BAN MILITARY EXPORTS

President Roosevelt is empowered to prohibit exports of machinery, tools and other military equipment or munitions in a bill (S. 4025) passed by the senate last week. A very similar bill previously had been passed by the house. However, some amendments were made in the senate and it has been returned to the house where the senate amendments will either be agreed to or the bill sent to conference. Section granting the President power to invoke an embargo:

"Sec. 6. Whenever the President determines that it is necessary in the interest of national defense to prohibit or curtail the exportation of any military equipment or munitions, or component parts thereof, or machinery, tools, or material necessary for the manufacture, operation or servicing thereof, he may by proclamation prohibit or curtail such exportation, except under such rules and regulations as he shall prescribe. Any such proclamation shall describe the articles or materials included in the prohibition or curtailment contained therein. In case of the violation of any provision of any proclamation, or of any rule or regulation, issued hereunder, such violator or violators, upon conviction, shall be punished by a fine of not more than $10,000, or by imprisonment for not more than two years, or by both such fine and imprisonment. The authority granted in this section shall terminate June 30, 1942, unless the congress shall otherwise provide."

BILLION-DOLLAR TAX BILL APPROVED BY HOUSE

House of representatives after only one day's discussion, passed the new billion dollar tax bill. The bill has gone to the senate and its finance committee held hearings last week with all indications a favorable report will be made early this week. Some amendments are anticipated when the bill is on the senate floor for discussion.

Some discussion regarding legislation imposing excess profit taxes to prevent the creation of "war millionaires" occurred in the house. However, no action was taken. Efforts for such legislation may be made in the senate, but there is a general feeling in congress that excess profits tax legislation should await the new session in January. However, President Roosevelt said at a press conference last week he is in favor of taking this up at once rather than leaving it over until the next session.

GOVERNMENT WALSH-HEALEY PURCHASES TOTAL $742,305

During the week ended June 1, government purchased $742,305.64 worth of iron and steel products under the Walsh-Healey act as follows: Steel Improvement & Forge Co., Cleveland, $15,950; Crane Co., Washington, $46,405.66; American Steel & Wire Co. of New Jersey, Washington, $22,357.20.

Union Wire Rope Corp., Kansas City, Mo., $27,598.80; Armstrong Cork Co., Lancaster, Pa., $81,311.34; Murray Co., Atlanta, Ga., $91,206.35; Harvey Metal Corp., Chicago, $14,175; Lindberg Engineering Co., Chicago, $10,844; Russakov Die Casting Co., Chicago, $71,400.

Sheffield Steel Corp., Kansas City, Mo., $11,986.81; Pittsburgh Forgings Co., Coraopolis, Pa., $36,364.88; Colorado Fuel & Iron Co., Denver, $17,659.30; Lakeside Bridge & Steel Co., Milwaukee, $14,944; Gifford-Wood Co., Hudson, N. Y., $36,092.65; Crosby Co., Buffalo, $51,024.

Blaw-Knox Co., Pittsburgh, $37,500; Peter Gray Corp., Cambridge, Mass., $14,343.05; and Minneapolis-Moline Power Implement Co., Minneapolis, $141,142.60.

NYA PUBLISHES MACHINE TOOL INDUSTRY SURVEY

National youth administration, compiling specific occupational information concerning major industries, recently published a study of Ohio's machine tool industry. The survey shows it to be one of the state's nine leading industries, with 69 plants and 14,527 employes, as of 1937.

Statistics compiled at that time by United States census of manufactures indicate more than 30 per cent of the nation's machine tool employes worked in Ohio plants.

Prepared by Wilbur R. Hanawalt, the study is based on a survey of 19 representative machine tool plants employing 68.6 per cent of the industry's total in Ohio.

New Facilities for Purdue's Chemical, Metallurgical School

■ PURDUE university, West Lafayette, Ind., recently completed a new building to house its school of chemical and metallurgical engineering, now the largest in the country in point of enrollment. Erected at a cost of over $600,000, it consists of a 220 x 36-foot front; a short wing, 54 x 54 feet, having four stories and an attic; and a longer wing, 186 x 54 feet, having four stories and a basement. Although it contains 1,123,886 cubic feet with a floor area of 78,952 square feet, it represents less than one-half of the final building.

In the production metallurgy laboratory is a 1000-ampere, variable-voltage motor-generator set; arc-resistance and high-frequency furnaces; an 8 x 12-inch rolling mill; and heat treating equipment. Students are required to melt and refine steel, pour it into billets, reheat and roll them into shapes.

Incorporated in design of the building is a flexible concentrating plant with capacity for 300 pounds of ore per hour. This unit extends through two stories and with Hardinge mills, classifiers, sand pumps, tables, jigs, flotation apparatus, thickeners, etc., located on different levels, makes possible a wide variety of ore treatment.

Laboratories devoted to physical metallurgy and metallography are laid out on the production principle. The crude metal samples pass successively through a series of laboratories devoted to paper and wet polishing, etching, microscopic examination, photography, X-ray examination, physical testing, heat treatment, etc. Connected with this group of laboratories is one devoted to pyrometry which is exceptionally well equipped.

The laboratories devoted to electrometallurgy and electrochemistry are equipped with a 1200-ampere, single-phase motor-generator set; another to furnish 500 amperes of 2-120-volt direct current; and a large battery set. With this equipment, it is possible to carry out all types of arc resistance and induction melting, electroplating and electrorefining of metals.

Main hallways have false ceilings which in combination with hollow interior walls having an 18-inch free space provide service facilities for steam, air, vacuum, water, electricity, gas, etc. Where this interior wall space is not utilized by services, elaborate flow sheets and exhibits, furnished by industrial organizations and descriptive of the chemical and metallurgical industries, have been built in.

■ **Included in equipment of Purdue university's new chemical and metallurgical engineering building are an 8 x 12-inch rolling mill, an ore concentrating plant and complete laboratories for research in metals**

Purdue recently expanded the name of the school of chemical engineering to include metallurgical engineering and now offers a degree in the latter. Dr. John L. Bray is head of the school.

Steel Technique Is Demonstrated at Fair

■ To inform the public on the value of technical research in the steel industry, and how it affects steel products, United States Steel Corp. has added an actual demonstration in the Hall of Research, New York World's Fair.

High and low carbon steel springs are heat treated before the public by experienced steel men who explain every step and the fundamental theory. Springs then are subjected to load tests to show the effect of the heat treatment. Other exhibits include equipment to illustrate transformation from alpha to gamma iron which takes place in a steel wire as it is electrically heated through its critical temperature.

Died:

■ WILLIAM FAHEY, 72, president, Cleveland Screw Products Co., Cleveland, since its incorporation in 1915, June 9 in that city. He acted as general manager of the company, in addition to being president, until 1925. He was one of the original members of the firm when it was founded under the name of Gravity Carburetor Co.

♦

Harry C. Teele, 70, manager, Novo Engine Co., Lansing, Mich., June 1.

♦

William A. Harshaw, 78, chairman, Harshaw Chemical Co., Cleveland, June 4 at his home in Gates Mills, O.

♦

John J. Mettler, 44, president, M. B. Mfg. Co., and secretary-treasurer, Mettler Machine Co., New Haven, Conn., June 1 at his home there.

♦

Harry T. McDonald, 48, research engineer, Caterpillar Tractor Co., Peoria, Ill., at his home in that city, June 3. Mr. McDonald had been employed by Caterpillar and its predecessor 22 years.

♦

Henry Bond, 54, secretary-treasurer, Ross-Meehan Foundries, Chattanooga, Tenn., at the Alexian Brotherhood Rest Home on Signal Mountain, Tenn., June 6, after a long illness. Mr. Bond joined Ross-Meehan Foundries in 1919 as auditor, later was promoted to assistant secretary-treasurer, and in 1925 to secretary-treasurer.

♦

John T. Corbett, 78, former vice president, Hayden-Corbett Chain Co., Columbus, O., and Huntington, W. Va., in Columbus, June 9. Mr. Corbett was also former chairman of the board, United States Chain & Forging Co., organized in 1920 by consolidation of the James McKay Co., Pittsburgh; National Chain Co., Marietta, O., and Hayden-Corbett Co.

Tough Job

BUT A CINCH FOR GUN TAPS

The G. T. D. Gun Tap is always a good bet on "through" holes in stringy metals. It cuts with a shearing action, shooting the chips ahead and preventing clogging in the flutes.

Wanted: A deep thread in a specially tough steel —and rapid production vital. No time to "nurse" the tap — no time to waste changing dull or broken taps either. • The illustration shows half the answer — a sturdy G. T. D. Greenfield "Gun" Tap. Its shallow flutes provide the extra strength needed to tap deep "through" threads at high speed. • The other half of the answer is in the special angle of the gun tap point and the proper cutting oil, resulting from a G. T. D. Greenfield Engineer's study of the job — on the job.

Any manufacturer can get G. T. D. Greenfield expert tool service by writing to the address below — no obligation.

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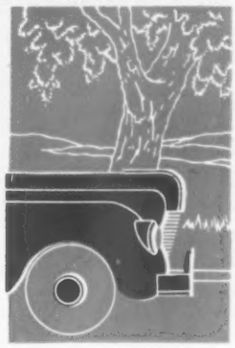
Detroit Plant: 2102 West Fort St.
Warehouses in New York, Chicago, Los Angeles and San Francisco
In Canada: Greenfield Tap & Die Corporation of Canada, Ltd., Galt, Ontario

GTD GREENFIELD

TAPS · DIES · GAGES · TWIST DRILLS · REAMERS · SCREW PLATES · PIPE TOOLS

Mirrors of *MOTORDOM*



By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

■ BORN from the marriage of science and industry, according to godfather Fred M. Zeder, the Chrysler Corp. truly has been a prodigal son in the first 15 years of its existence. And if the output of Chrysler's vast new engineering laboratories where a staff of 2000 delves into the problems of the motor car of today and tomorrow is any measuring stick, the next fifteen years should be equally productive and profitable.

Speaking at the press preview of the new labs, Mr. Zeder drew repeated laughter and applause with his characteristically pungent remarks. His experience with the motor car industry dates well ahead of the organization of Chrysler, and he recalled expressively how in its early days the technique of building automobiles was approximately "guess one-half and multiply by two," with the bulk of materials and equipment buying being done over the bar of the old Pontchartrain hotel in downtown Detroit.

The automobile then was virtually the "assembly of a bunch of cast iron and steel," as Zeder put it. Materials were bought largely by trade names instead of measured performance characteristics of today. A barrel of magic quenching oil, costing $3, was found by analysis to be nothing more than rain water and "stable product." One of the larger companies contracted for a metallurgical microscope, and before it was even installed had to sell it because the price of $1800 could not be met.

As the industry outgrew its swaddling clothes, the emphasis came to be placed on a dizzy expansion of output, with the reins in the hands of what Zeder called "that damned production bunch." Came 1929 and this bubble burst. Since then the era of scientific research and instrumentation has dawned and competition in motor cars has been between groups of engineers, each seeking to out-research the other. The result: Greatly increased values, together with lower costs. More for the money is still the watchword.

A trip through the new Chrysler laboratories which even now are not fully staffed and equipped, is ample testimony to the emphasis on engineering and research. Two new buildings have been added to facilities already available in Chrysler's six-story administrative and design building; two more buildings—a three story new model program building and road car laboratories—are proposed for early construction.

Fight Science with Science

The departments inspected ten days ago include cold rooms, engine tests, fuel tests, diesel tests and a variety of dynamometers, all in the dynamometer building; and body research, wind tunnel, electrical, chemical and metallurgical laboratories, all in a refurbished three-story export building.

Most striking features are the wide hallways, spacious test rooms, effective lighting and ventilation, as well as the streamlining, plating and coloring of practically all test equipment. In many respects, the labs suggest a moving picture director's conception of research facilities—spotless tiled floors, venetian blinds at all windows, chromium plated test machines, etc.

To present a detailed report on research work in progress would require volumes; here and there, however, were seen unusual phases of investigation. For example, one project was concerned with perfecting methods to bond brake lining material to brake shoes without the use of rivets. Spectacular also was work being done with high-frequency electric current for heat treatment of such parts as gears.

In the general mechanical laboratory complete cars were dismantled and the parts grouped on benches for study. In this connection, the breakdown of the weight of a standard Plymouth gave interesting insight into weight distribution. Figures showed the body to weigh 967 pounds; engine 604 pounds, frame 206 pounds; unsprung front end 199 pounds and unsprung rear end 307 pounds—a grand total of 2283 pounds. On this basis, unsprung weight amounts to 22 per cent of the total mass.

Concluding remarks made by Mr. Zeder at the press luncheon were pointed. He said: "War heretofore has been a business of guns and gun fodder. Today mechanized warfare is a problem of science. You have to fight fire with fire, science with science. This new brand of warfare, this mechanized warfare, predicated as it is around the internal combustion engine, is right down our alley.

"Who conceived the airplane, who conceived the tank and the submarine? Surely we ought to know our own babies a little better than the other fellow. We have the plants, we have the facilities, and we have the technical personnel.

"May these laboratories and the many thousands of other laboratories scattered throughout the length and breadth of this country serve as our first line of defense. May they serve as those fortifications that science and science alone must recognize."

■ HOLDING his first formal press conference as acting president of General Motors Corp., C. E. Wilson told a group of about 25 reporters here a week ago that the corpora-

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tion holds its plants in readiness to co-operate on armament work, but until explicit instructions are received from Washington it is impossible to determine what will be produced and in what plants the work will be done. He stated that armament production should not interfere with automobile production because of the ample production capacity of GM; that 1941 models will embody a goodly number of changes; that they will be introduced about the same time as last year.

Commenting on aircraft production, he said that the term "mass production" was assumed incorrectly by many to connote long conveyor lines and assembly lines. More accurately it is the proper balancing of equipment and the expedition of the flow of material to the final assembly line.

Questioned about labor problems, he said that the corporation's contract with the UAW-CIO still is in force and that negotiations for a new contract are proceeding smoothly. Bone of contention at the present time is the union's demand for higher wages, based on the charge that the corporation's profits in 1939 indicate ample ability to pay higher rates. As Mr. Wilson pointed out, wage rates are not determined by a company's profits, but by competitive rates and the cost of living. Obviously if profits were the determining factor, some companies would have to pay off their forces in buttons.

Mr. Wilson said determined efforts were being made to avoid the "old spiral" of rising wages, costs and prices which in the end work unfair hardships on large numbers of people. He added that wage rate determinations were in the hands of local plant managers who have been compelled to hold up some contemplated increases during the course of negotiations with the union.

■ POINTING out that over the past ten years, the motor industry has accounted for products valued at just under three billions of dollars annually, Alvan Macauley, president of the Automobile Manufacturers association, speaking at its annual meeting in Detroit last week, emphasized that the principal job of the industry was to keep the nation's transport system of 30,000,000 units supplied with new vehicles and to expand its usefulness. Nevertheless the industry is prepared to meet any emergency demands for armament production.

"The entire armament program, at present in the making, drawing upon the capacity of scores of industries and spread over more than one year, does not much exceed one normal year's output of the automotive industries," he added.

Continuing, Mr. Macauley who is chairman of the board of Packard Motor Car Co., said that if this nation is to be able to bear the taxes that will be required to pay for the necessary defense program, normal production for sale to the domestic market must go forward at the largest possible rate.

"While we contribute what is needed to equip our defense establishment," he said, "we can do most to maintain the strength of this country by keeping up our normal business. Payrolls and employment must be created not only in factory cities but everywhere that cars and trucks are sold and used.

"Combining the two jobs—one immediate emergency service to external defense, the other, domestic defense of national prosperity—is a challenge to private management. We are prepared to meet it."

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1938	1939	1940
Jan.	226,952	356,962	449,492
Feb.	202,597	317,520	422,225
March	238,447	389,495	440,232
April	237,929	354,266	432,433
April	237,929	354,266	452,433*
May	210,174	313,248	415,158†
July	150,450	218,494	.....
Aug.	96,946	103,343	.....
Sept.	89,623	192,678	.....
Oct.	215,286	324,688	.....
Nov.	390,405	368,541	.....
Dec.	406,960	469,120	.....
Year	2,655,171	3,732,608	.....

*Revised. †Estimated.

Estimated by Ward's Reports

Week ended:	1940	1939†
May 18	99,030	80,145
May 25	96,810	67,740
June 1	61,255	32,445
June 8	95,560	65,265
June 15	93,635	78,305

†Comparable week.

■ READYING its first steel buy for 1941 models, Ford is expected to release specifications in a week or ten days. Production of 1940 models is slated to draw to a close on July 19, somewhat earlier than had been anticipated originally. Several explanations are possible. Slowing of retail sales in May and June without any appreciable slackening in output has served to build up stocks in the field, among all producers, to a high level. With enough new cars on hand to cover even a protracted shutdown and the possibility of armament work being scheduled before long, it appears a prudent policy to wind up 1940 production as quickly as possible, complete plant inventories and retooling and thus be ready for any eventuality.

Newspaper stories of Mr. Ford's proposal to build airplanes in large volume are read with equal interest by most Ford officials, who know little if anything of plane production plans for Rouge plant.

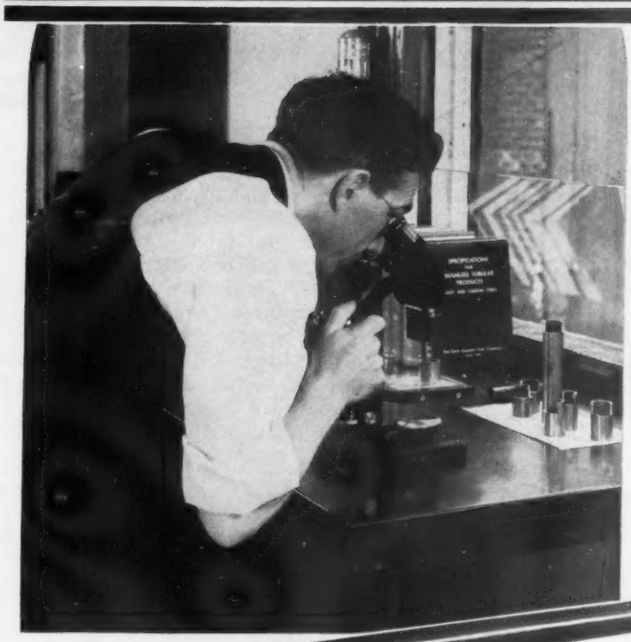
■ QUICK glance at new model probabilities among the various plants reveals that one of the principal developments by Ford will be an entirely new type of body and suspension system. What power plant will be used in this job is not known in trade circles. Some observers also believe possible a new version of the Zephyr to bring it more into competition with the fast-moving Buick lines.

General Motors cars will feature body changes in the main, with the chance some further adaptation of the hydraulic coupling and automatic transmission may be made in divisions other than Oldsmobile. Buick is understood to be grooming a new model for 1941, priced under the present 40 series, its lowest priced model. Popularity of the Torpedo body developed for the 50 and 70 Buick seems to assure its use throughout the Buick groups next year, with perhaps new "style leaders" taking the place of the Super and Roadmaster cars.

Most significant mechanical change appearing on the 1941 horizon is the extension of Chrysler's fluid drive to Dodge and De Soto. Reports are heard, without confirmation of course, that a much smaller and more compact transmission has been developed for use in conjunction with the fluid drive, providing two speeds forward and the usual reverse gear. Getaway and acceleration are said to be affected in only minor degree, with the average driver being unable to detect any appreciable difference. Conventional clutch will be retained, but Chrysler engineers make no bones about saying that they consider the day of the clutch nearly over, in fact have veered away from research on clutches purposely.

Novel device now being supplied to a fleet of taxicabs in New York by Detroit Harvester Co. here is hydraulic control mechanism for raising and lowering windows. Actuated by a set of four levers on the dash, each one of which can be moved either up or down, hydraulic cylinders and pistons are installed in each door to operate the conventional window regulator assembly. Hydraulic power is supplied by a pump driven off the starter motor. Details of the device are being closely guarded by Detroit Harvester, but it is not considered likely the lifts will appear on 1941 models.

AT OHIO SEAMLESS



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By long experience we know that no step is unimportant in the manufacture of high quality seamless steel tubing. That is why we give such painstaking attention to every detail

Your interest in **OHIO SEAMLESS STEEL TUBING** quite naturally centers around the question of how it can serve you—meeting your most exacting specifications. That implies an interest in some of the basic reasons why, as well as how, **OHIO SEAMLESS** meets your requirements.

Avoiding technicalities and getting right down to brass tacks, we plan to present the story behind the making of **OHIO SEAMLESS STEEL TUBING** in a way that will answer those questions on both why and how. In the following months we will use this space to take you behind the scenes on a personally conducted tour. We believe you will find it both informative and interesting.

In the meantime we suggest that you consult our sales engineers on any steel tubing problem. They welcome the opportunity of being of service to you.

32 YEARS CONTINUOUS OPERATION ★ SHELBY, OHIO BIRTHPLACE OF *Seamless* STEEL TUBE INDUSTRY IN AMERICA

MEN of INDUSTRY

■ MacGILVRAY SHIRAS, director of raw materials, Carnegie-Illinois Steel Corp., Pittsburgh, has retired with a service record of more than 47 years. He joined the United States Steel Corp. subsidiary in 1893 as a chemist at the Ohio works. He subsequently was placed in charge of pyrometers and was a blast furnace burden clerk at Duquesne works, shortly thereafter becoming assistant superintendent of blast furnaces. In 1901 Mr. Shiras went to Pittsburgh as assistant ore agent and in 1910 was made ore agent. He was named director of raw materials in 1935.

M. M. Cadman, since October, 1935, assistant director of raw materials, succeeds Mr. Shiras as director of raw materials. He has been with Carnegie since 1903.

♦

Phil L. Capy, Dallas, Tex., has been appointed district engineer in Texas for the Despatch Oven Co., Minneapolis.

♦

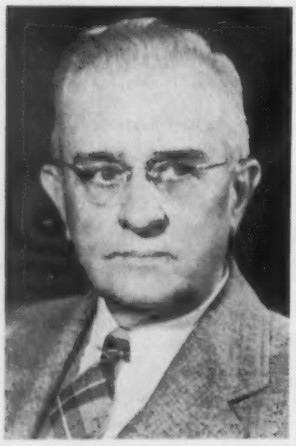
H. G. Coffey, heretofore assistant manager of sales, Aetna-Standard Engineering Co., Youngstown, O., has been promoted to manager of sales.

♦

Albert S. Low, vice president and chief engineer, Austin Co., Cleveland, has been appointed to the structural steel welding research committee of the Engineering foundation, which will study problems of design and fabrication in the building field.

♦

William Creider, associated with the Oilgear Co., Milwaukee, 17 years, the last 12 of which he was general manager, is now machine tool sales manager of Cimatool Co., and sales manager of Sheffield Gage Corp., Dayton, O.



William Creider

M. M. Cadman

♦

Gerald E. Stedman has been appointed sales manager, Rego division, Bastian-Blessing Co., Chicago. Mr. Stedman is well known in merchandising, research, sales training and public relations circles.

♦

F. A. Beardsley, who has represented National Forge & Ordnance Co., Irvine, Pa., along the eastern seaboard the past ten years, has been appointed sales manager, with headquarters at Irvine.

♦

W. L. Gourley has been elected president, Lehmann Machine Co., St. Louis. Paul Lehmann, former president, who has disposed of his interests in the company, will remain with the organization for the ensuing year.

♦

Sidney Isenberg, a recent metallurgical engineering graduate of Ohio State university, has joined the research staff of Battelle Memorial institute, Columbus, O., and has been assigned to the ore concentration division.

♦

A. L. Kershaw, manufacturers' representative, has been elected chairman of the Toledo, O., group, American Society for Metals. O. C. Schultz, National Supply Co., is the new vice chairman, and C. C. Eels, Northern Ohio Natural Gas Co., secretary.

♦

Max F. Becker, associated with Whiting Corp., Harvey, Ill., 20 years, has been appointed vice president in charge of sales representatives. He first served with the pulverizer division, and after several years in various departments Mr. Becker was made manager, foundry equipment division. Last year he became sales manager, industrial division.

♦

C. T. Hertzsch, district manager of the Jeffersonville, Ind., plant of American Car & Foundry Co., has been made district manager of the company's Buffalo plant, which has received an $8,000,000 British war order, mostly for shells. When the order has been filled, Mr. Hertzsch expects to resume his post at Jeffersonville.

♦

Fred H. Pinkerton, sales promotion manager, mechanical goods division, United States Rubber Co., New York, has been elected president, Industrial Marketers of New Jersey, chapter of the National Industrial Advertisers association. He succeeds Richard S. Hayes, advertising manager, Okonite Co., Passaic, N. J.

♦

Deane Murphy has been advanced to eastern manager, flat rolled carbon steel sales, Allegheny Ludlum Steel Corp., with headquarters in the New York office. Mr. Murphy entered the employ of United States Steel Corp. in the flat wire and spring department of American Steel & Wire Co.'s North works, Worcester, Mass.; in 1910 was transferred to the New York sales department, and seven years later joined West Leechburg Steel Co., in charge of eastern territory. When this company was absorbed by Allegheny

Max F. Becker

Steel Co., he was assigned to the New York sales office.

♦

F. W. Fenner has joined Jessop Steel Co., Washington, Pa., as representative in the Cleveland district, with headquarters at 1210 East Fifty-fifth street. Mr. Fenner began his career as representative for William Jessop & Sons; later was Cleveland manager for Latrobe Electric Steel Co., and recently was sales representative for Firth Sterling Steel Co., McKeesport, Pa.

♦

Paul Lindberg, until recently superintendent of rolling mills, Steel & Tube division, Timken Roller Bearing Co., Canton, O., has been appointed superintendent of rolling mills of the steel division of Copperweld Steel Co., Warren, O. His experience consists of over 42 years in

Fred L. Lawrence
Whose appointment as district manager at Detroit for Copperweld Steel Co., Warren, O., was announced in STEEL, June 3, p. 28

steel mill work in all capacities from roller to superintendent of rolling mills.

♦

John J. Borrup has been appointed production manager, Pratt & Whitney Aircraft division, United Aircraft Corp., East Hartford, Conn., and G. H. D. Miller, assistant factory manager, has been promoted to factory manager, while Daniel Jack becomes assistant factory manager. These appointments have been made to increase engine production of the division to meet requirements of national defense. In his new capacity, Mr. Borrup will supervise the production of Pratt & Whitney Aircraft's subcontractors.

♦

D. W. Russell has been elected president of Airtemp, air conditioning and heating division in Dayton, O., of Chrysler Corp. He succeeds Col. A. C. Downey, who is taking an extended leave of absence due to ill health. Mr. Russell joined Chrysler in 1931

J. C. Harrington
Who has been elected president and general manager, National Forge & Ordnance Co., Irvine, Pa., succeeding the late C. E. Wilder, as noted in STEEL, June 10, p. 28. He formerly was vice president. Mr. Harrington has been with the company 25 years, advancing through successive steps in production, sales and management

and since that time has done technical and sales work in the company's Fargo division, of which he was made a vice president in 1932.

♦

George W. Person, associated with the sales engineering department of Norton Co., Worcester, Mass., has been transferred to the St. Louis territory for special grinding wheel field service. He will assist the present representative, Arthur W. Cox, and co-operate with several Norton distributors.

J. L. de Vou Jr. and George L. Freeman have been appointed field engineers in the Cleveland and Chicago districts, respectively. Both have had experience in Norton's laboratories and sales engineering department at Worcester as well as field work in other districts.

♦

Alvin E. Dodd has been re-elected president, American Management association, New York. Other officers are: Chairman of the board, W. L. Batt, president, SKF Industries Inc., Philadelphia; chairman executive committee, Thomas Roy Jones, president, American Type Founders Inc., Elizabeth, N. J.; chairman, finance committee; Harold V. Coes, manager, industrial department, Ford, Bacon & Davis Inc., New York; treasurer, James L. Madden, third vice president, Metropolitan Life Insurance Co., New York; secretary, H. J. Howlett, 330 West Forty-second street, New York.

♦

Eugene E. Wilson, president, United Aircraft Corp., East Hartford, Conn., has announced the appointments of H. Mansfield Horner as general manager, Pratt & Whitney Aircraft division; Sidney A. Stewart as general manager, Hamilton Standard Propellers division, and Charles J. McCarthy as general manager, Vought-Sikorsky Aircraft division at Stratford, Conn. At the same time, Mr. Wilson announced new duties for Raycroft Walsh, recently elected vice president. He will be charged, under the president, with supervision and control of operations of the several divisions.

♦

A. E. Eck, heretofore assistant general superintendent, Central Iron & Steel Co., Harrisburg, Pa., has been made general superintendent of operations. He succeeds the late Warren Elsey Jr. William F. Zerbe, chief metallurgist, has been made assistant general superintendent, succeeding Mr. Eck.

Before joining Central Iron & Steel in 1916 as chief draftsman, Mr. Eck was associated with the operating and engineering departments of Cambria Steel Co., Johnstown, Pa., and the engineering department of the former Carnegie Steel Co. He became chief engineer at Central in 1925 and early in 1939 was named assistant general superintendent.

Mr. Zerbe has been associated with the company since 1911, starting as an apprentice chemist. In 1923 he was made chief chemist, and in 1931 was promoted to chief metallurgist.

♦

J. H. Slater, formerly superintendent of blast furnaces and coke works, Republic Steel Corp., Cleveland, has been appointed assistant manager in charge of steel works. H. H. Holloway, present assistant district manager, has been placed in charge of all finishing mills. B. W. Norton, assistant district manager at Youngstown, O., has been transferred to the Warren district in the same capacity, while J. H. Graft, assistant district manager at Warren, has been transferred to Youngstown in a similar capacity.

M. D. Wald, formerly superintendent of Cleveland district coke ovens, succeeds Mr. Slater as superintendent of blast furnaces, coke ovens and docks. C. M. Schoenlaub, assistant superintendent, Warren open-hearth department, has been made assistant superintendent, Cleveland open-hearth department, and B. D. McCarthey, assistant superintendent, Cleveland open-hearth department, has been transferred to Warren in the same capacity.

William Rodgers, heretofore chief metallurgist at Buffalo, has been transferred to Cleveland as chief metallurgist, with P. P. Echols, formerly chief metallurgist at Warren, as assistant chief metallurgist.

J. J. Bowden, heretofore chief metallurgist of the Cleveland district, returns to Warren as chief metallurgist, and J. D. Dickerson, assistant chief metallurgist at Buffalo, has become chief metallurgist there.

EDITORIAL

Simplification Is Needed—Soon

■ STEEL has received a number of interesting comments referring to the editorial entitled "Simplification Is Needed" which appeared in its issue of June 10. They show that a move to effect a sharp reduction in the number of steels now made would meet with a widely favorable response—particularly by many consumers who are familiar with the beneficial results that come from intelligent standardization. They also reveal that many steel consumers are not sufficiently familiar with the steel business to understand thoroughly as to just what would be involved.

Some of them ask whether simplification would have an effect on existing standards such as SAE and ASTM steels. The answer, of course, is in the negative. These standards —which in themselves constitute an important approach to simplification—are firmly established and any attempt to disturb them could result only in harmful confusion. Simplification does not mean replacing old standards with new ones. It means simply the selection of a certain number of the existing specifications to be known as "significant" steels. From the list of "significant" steels, a consumer would be able to pick a particular steel that would meet practically any requirement.

Maximum Production Will Dictate Simplification as Efficiency Measure

As to the number of significant steels, that point is controversial. Earle C. Smith, in discussing the subject (STEEL of June 3, p. 44) before the recent American Iron and Steel institute meeting, thought that such a list could be confined to not more than 200 steels. Agreement will not be reached easily if left to industry—because every one of the 5000-odd steels now made is somebody's pet, to be handled with caution and respect.

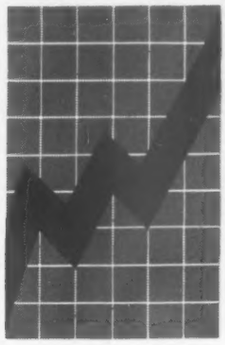
It seems more than likely that simplification will come soon—if armament manufacture, as now appears imminent, is pushed to a volume that will demand maximum production in this country. Recently the manufacturers of airplane engines simplified their steel specifications as a part of their move to eliminate bottlenecks in engine production. The same trend has been seen of late with reference to certain other products. When steel mills operate at capacity and it becomes difficult to get out enough steel to go around, intelligent supervision of the arms program will require complete simplification so as to permit the mills to get out products without being handicapped by the delays incidental to producing small batches of steel to suit unnecessary specifications.

Better Service, Lower Costs from Reduced Number of Steel Specifications

Consumers would gain fully as much as the mills from a simplification program. The mills could give them better service in the form of prompt shipments. Too, consumers would benefit economically in the long run for the reason that a simplified list of steels would mean lower steel production costs.

As it now stands the American system of steel specifications represents inefficiency in alarming degree. The government buys under certain specifications, industry under others. There are great differences in the practices of competitors in the same industries. One large automobile company, for example, finds that it can fill all of its diversified requirements with 48 steels. Another buys steel to some 135 specifications. In Germany the opposite condition prevails. Some years ago German industry agreed on 108 significant steels—and even before the war started last September it required almost an edict from Hitler to get a German mill to make steel not covered by this list. Simplification must come here —and soon.

The *BUSINESS TREND*



Heavy Industries Lead Business Upturn

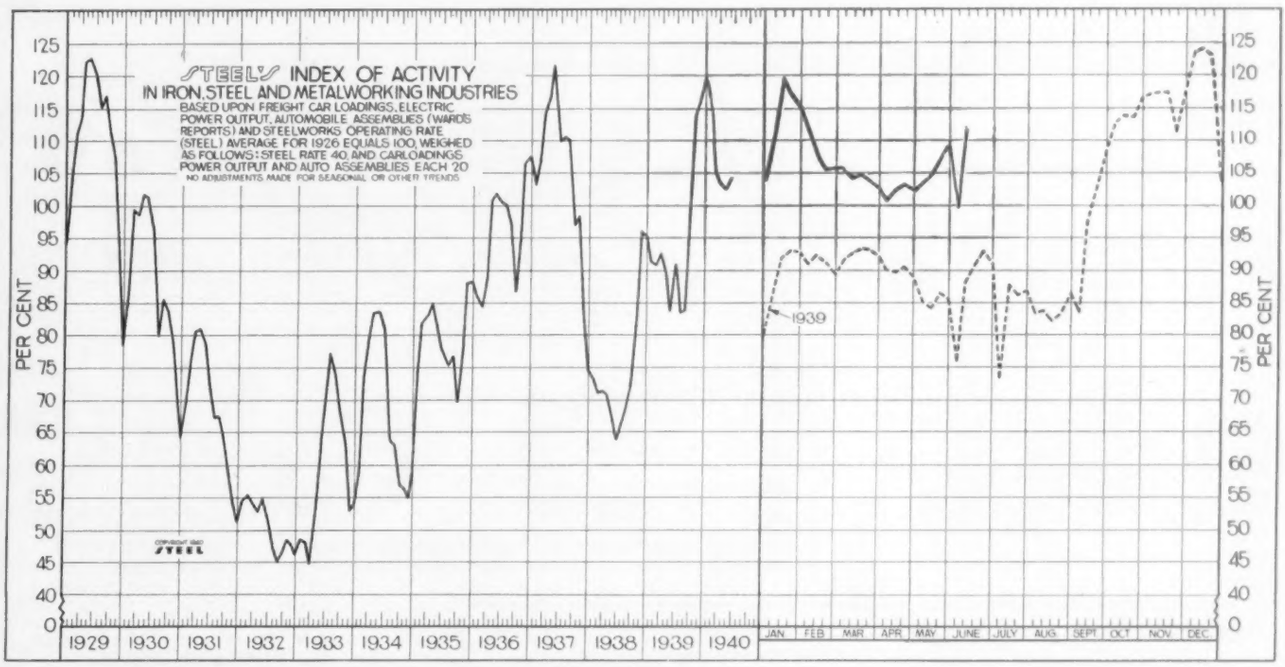
■ BOLSTERED by a sharp upturn in foreign demand and continued expansion in domestic buying, industrial activity in the metal producing and metal working industries rebounded sharply from the temporary interruption recorded during the week of June 1 due to Memorial day.

In the period ended June 8, STEEL'S index of activity stood at 111.9 in contrast with 99.2 during the holiday week and also topped the 109.1 level recorded in the period immediately preceding. The index is now at the highest level since the week ended Jan. 27, and further gains are indicated. At this time last year the index was 88.2.

Expansion of activity in the capital goods industries such as steel, machinery, construction, aircraft and shipbuilding have more than offset curtailment in some consumer lines.

The steel industry has led in the improvement in general business activity and to date is at approximately the 85 per cent level, up 25 points, or 41.3 per cent, since the first of last month. Sharp gains also were recorded in revenue freight carloadings, electric power output and automobile production during the week of June 8.

Freight traffic reached a new high this year of 702,571 cars.


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARDS REPORTS) AND STEELWORKS OPERATING RATE (STEEL) AVERAGE FOR 1926 EQUALS 100, WEIGHED AS FOLLOWS: STEEL RATE 40 AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
1939
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

STEEL'S index of activity advanced 12.7 points to 111.9 in the week ended June 8:

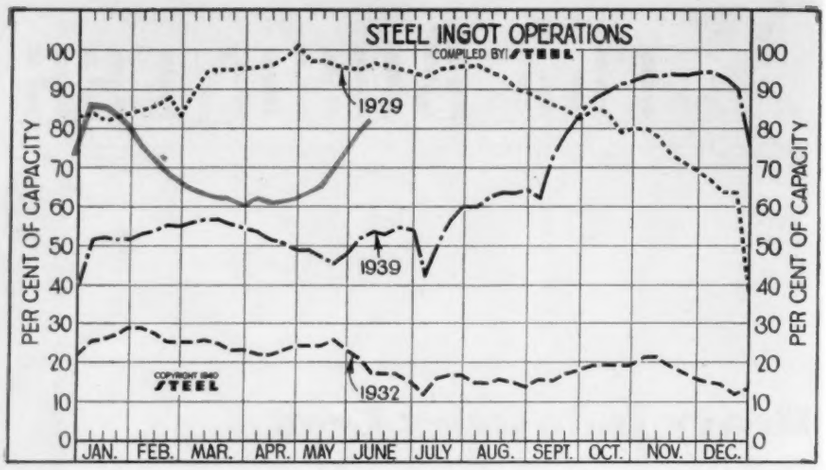
Week Ended	1940	1939
Mar. 30	103.2	92.2
Apr. 6	101.8	90.0
Apr. 13	102.7	89.7
Apr. 20	103.4	90.4
Apr. 27	102.8	89.2
May 4	103.3	85.1
May 11	104.8	84.2
May 18	106.8	86.6
May 25	109.1	85.4
June 1	99.2	75.9
June 8	111.9	88.2

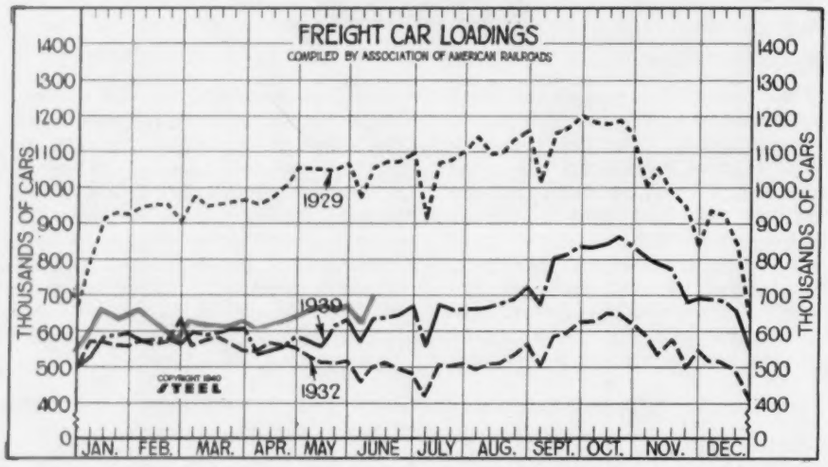
Mo. Data	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	104.1	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
May	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
June	.....	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	.....	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	.....	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Sept.	....	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Oct.	....	114.0	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Nov.	.....	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
Dec	....	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

Steel Ingot Operations

(Per Cent)

Week ended	1940	1939	1938	1937
Mar. 9....	63.5	56.5	30.0	87.0
Mar. 16....	62.5	56.5	32.0	89.0
Mar. 23....	62.5	55.5	35.0	90.0
Mar. 30....	61.0	54.5	36.0	91.5
Apr. 6....	61.5	53.5	32.0	91.5
Apr. 13....	61.0	51.5	32.0	91.5
Apr. 20....	61.5	50.5	32.5	91.5
Apr. 27....	61.5	49.0	32.0	91.0
May 4....	63.5	49.0	31.0	91.0
May 11....	66.5	47.0	30.0	89.0
May 18....	70.0	45.5	30.0	91.5
May 25....	75.0	48.0	28.5	75.0
June 1....	78.5	52.0	25.5	75.0
June 8....	81.5	53.5	25.5	74.0





Freight Car Loadings

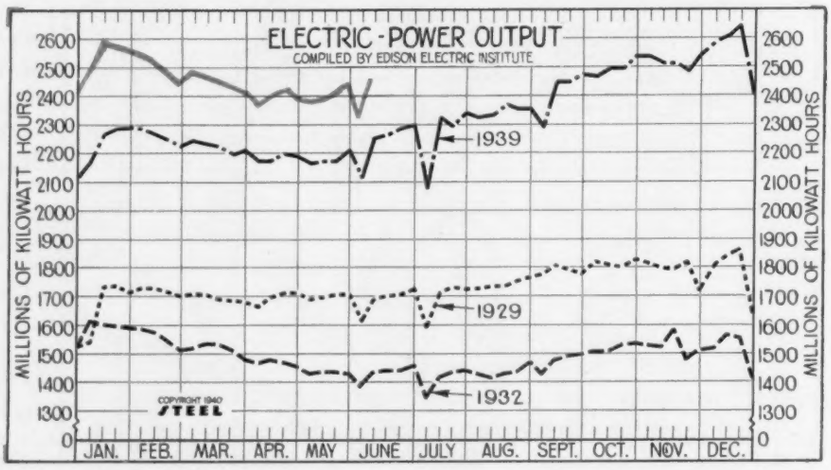
(1000 Cars)

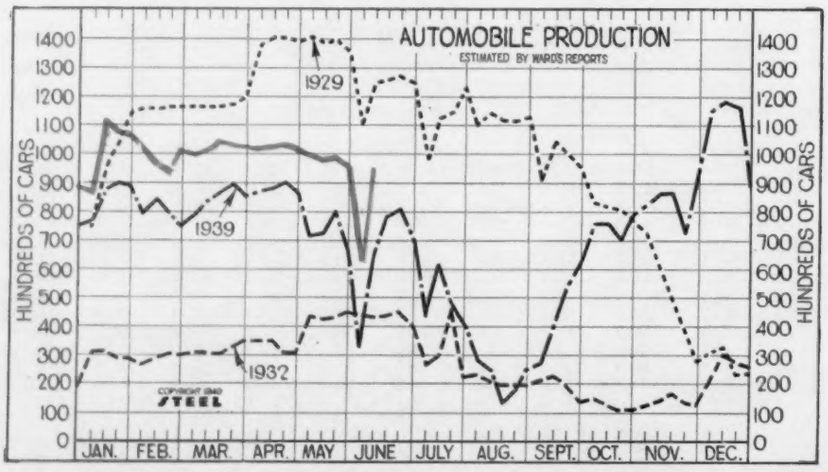
Week ended	1940	1939	1938	1937
Mar. 9.....	621	592	557	749
Mar. 16.....	619	595	540	759
Mar. 23.....	620	605	573	761
Mar. 30.....	628	604	523	727
Apr. 6.....	603	535	522	716
Apr. 13.....	619	548	538	751
Apr. 20.....	628	559	524	761
Apr. 27.....	645	586	543	782
May 4.....	666	573	536	767
May 11.....	681	555	542	774
May 18.....	679	616	546	779
May 25.....	687	628	562	795
June 1.....	639	568	503	692
June 8.....	703	635	554	754

Electric Power Output

(Million KWH)

Week ended	1940	1939	1938	1937
Mar. 9....	2,464	2,238	2,015	2,213
Mar. 16...	2,460	2,225	2,018	2,211
Mar. 23...	2,424	2,199	1,975	2,200
Mar. 30...	2,422	2,210	1,979	2,147
Apr. 6....	2,381	2,173	1,990	2,176
Apr. 13...	2,418	2,171	1,958	2,173
Apr. 20...	2,422	2,199	1,951	2,188
Apr. 27...	2,398	2,183	1,939	2,194
May 4....	2,386	2,164	1,939	2,176
May 11...	2,388	2,171	1,968	2,195
May 18...	2,422	2,170	1,968	2,199
May 25...	2,449	2,205	1,973	2,207
June 1...	2,332	2,114	1,879	2,131
June 8...	2,453	2,257	1,992	2,214

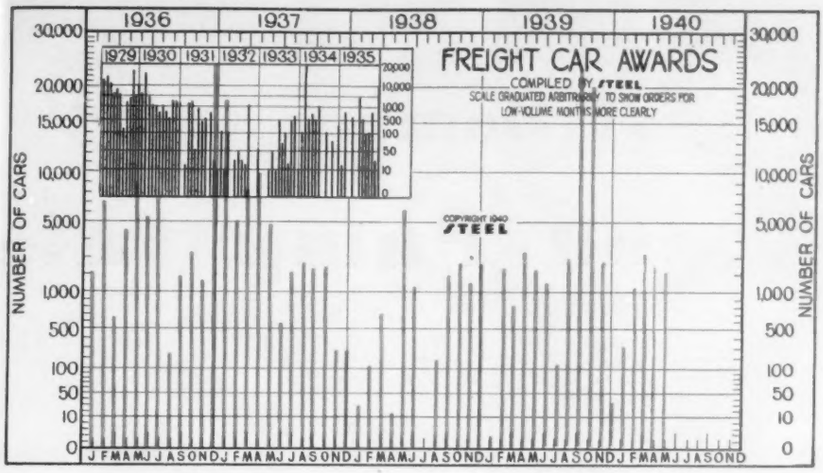




Auto Production

(1000 Units)

Week ended	1940	1939	1938	1937
Mar. 9....	103.6	84.1	57.4	101.7
Mar. 16....	105.7	86.7	57.5	99.0
Mar. 23....	103.4	89.4	56.8	101.0
Mar. 30....	103.4	86.0	57.5	97.0
Apr. 6....	101.7	87.0	70.0	99.2
Apr. 13....	101.9	88.0	62.0	125.5
Apr. 20....	103.7	90.3	60.6	133.2
Apr. 27....	101.4	86.6	50.7	139.5
May 4....	99.3	71.4	53.4	140.2
May 11....	98.4	72.4	47.4	140.4
May 18....	99.0	80.1	46.8	131.3
May 25....	96.8	67.7	45.1	131.4
June 1....	61.3	32.4	27.0	101.7
June 8....	95.6	65.3	40.2	118.8


1936
1937
1938
1939
1940
1929 1930 1931 1932 1933 1934 1935
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW-VOLUME MONTHS MORE CLEARLY
COPYRIGHT 1940 STEEL
NUMBER OF CARS
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

Freight Car Awards

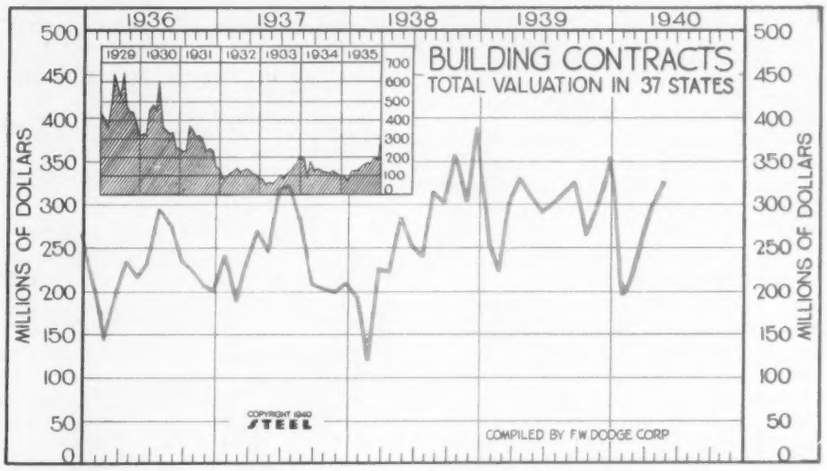
(Hundreds of Cars)

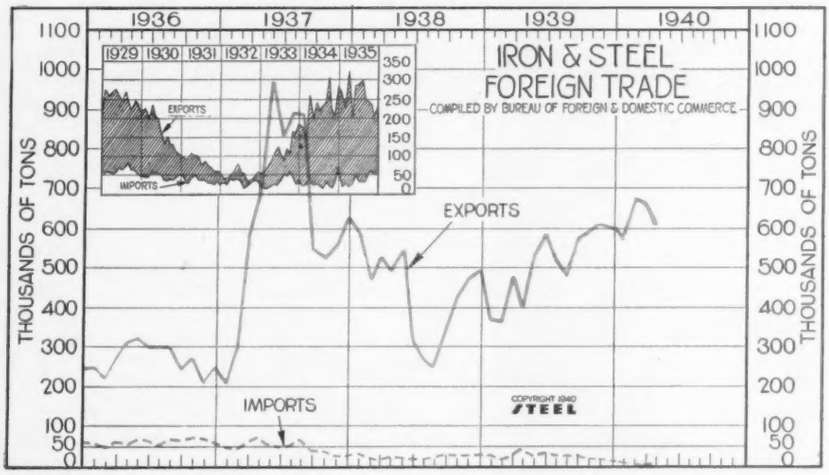
	1940	1939	1938	1937
Jan.	3.60	.03	.25	178.06
Feb.	11.47	22.59	1.09	49.72
Mar.	31.04	8.00	6.80	81.55
April	20.77	30.95	.15	97.72
May	20.10	20.51	60.14	47.32
June	.....	13.24	11.78	5.48
July	.....	1.10	.00	10.30
Aug.	.....	28.14	1.82	14.75
Sept.	.....	230.00	17.50	12.16
Oct.	.....	196.34	25.37	13.55
Nov.	.....	26.50	12.32	2.75
Dec.	.....	.35	25.81	2.75
Total	.....	577.75	163.03	516.11

Construction Total Valuation In 37 States

(Unit: $1,000,000)

	1940	1939	1938	1937	1936
Jan.	$196.2	$251.7	$192.2	$242.7	$204.8
Feb.	200.6	220.2	118.9	188.3	142.1
Mar.	272.2	300.7	226.6	231.2	199.0
April	300.5	330.0	222.0	269.5	234.8
May	328.9	308.5	283.2	243.7	216.1
June	.....	288.3	251.0	317.7	232.7
July	.....	299.9	239.8	321.6	294.7
Aug.	.....	312.3	313.1	281.2	275.3
Sept.	.....	323.2	300.9	207.1	234.3
Oct.	.....	261.8	357.7	202.1	225.8
Nov.	.....	299.8	301.7	198.4	208.2
Dec.	.....	354.1	389.4	209.5	199.7
Ave.	.....	$295.9	$266.4	$242.8	$222.3





Iron and Steel Foreign Trade

(Thousands of Tons)

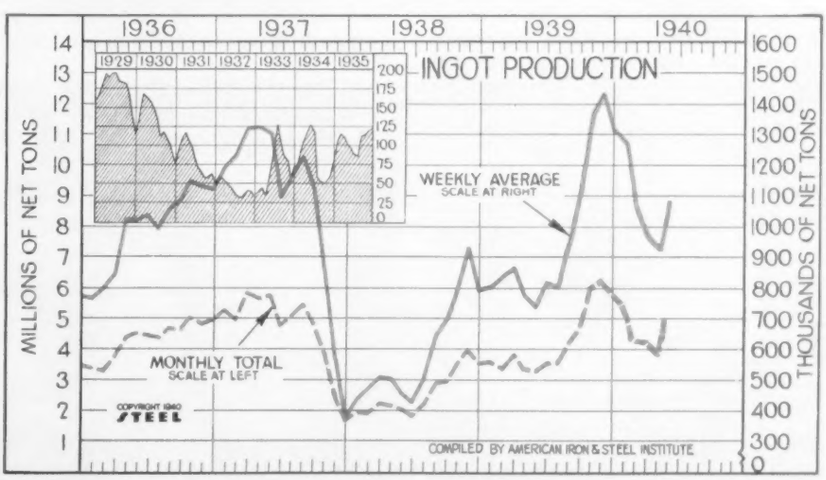
	Exports			Imports		
	1940	1939	1938	1940	1939	1938
Jan.	583.6	362.7	586.3	8.3	27.7	29.6
Feb.	671.3	359.7	460.6	6.7	19.1	19.6
Mar.	664.0	474.4	526.9	5.1	25.4	11.8
April	612.9	394.0	489.2	6.7	44.1	21.2
May	.....	532.6	540.6	...	28.1	20.8
June	.....	588.9	312.0	...	32.6	15.9
July	.....	513.7	263.7	...	30.8	14.7
Aug.	.....	477.1	242.1	...	28.3	20.0
Sept.	.....	575.6	346.1	...	29.9	28.0
Oct.	.....	591.9	425.4	...	19.2	26.4
Nov.	.....	605.6	6.46.2	...	15.2	27.6
Dec.	.....	600.4	490.1	...	14.7	28.8
Tot'l.	.....	6076.4	5152.7	...	315.2	264.6

Steel Ingot Production

(Unit 100 Net Tons)

	Monthly Total		Weekly Average	
	1940	1939	1940	1939
Jan.	5,655.3	3,578.9	1,276.6	807.9
Feb.	4,409.0	3,368.9	1,065.0	842.2
Mar.	4,264.8	3,839.1	962.7	866.6
Apr.	3,974.7	3,352.8	926.5	781.5
May	4,841.4	3.295.2	1,092.9	743.8
June	.....	3,523.9	.....	821.4
July	.....	3,564.8	.....	806.5
Aug.	.....	4,242.0	.....	957.6
Sept.	.....	4,769.5	.....	1,114.4
Oct.	.....	6,080.2	.....	1,372.5
Nov.	.....	6,147.8	.....	1,433.0
Dec.	.....	5,822.0	.....	1,317.2
Total	.....	51,585.0	.....	989.4†

†Weekly average.



Fabrication of Dam Penstock and Pump Inlet Linings For Grand Coulee . . .

Steel plates up to 3¼ inches thick are fabricated into lining sections near dam site in a shop erected especially for this work. Unusual fabricating and testing procedures are employed

■ FIELD fabrication of some 8300 tons of steel plates is a feature of the job of furnishing penstock and pump inlet linings for Grand Coulee dam. Because of the size of the fabricated pieces, it would be impractical to transport these sections if made elsewhere, so a modern fabricating plant was designed and built "on location". It is a prefabricated structure, 70 x 260 feet, of wood frame design and with split-ring connectors so it can be dismantled easily and moved when the job is completed.

The wood frame is covered with corrugated iron. Bottom chords of roof trusses are 45 feet above the floor line to maintain clearance for a gantry crane. There is no bracing between walls and roof trusses inside the building, needed bracing being provided by batter posts outside as shown in Fig. 1.

Rails extend through the building and several hundred feet at each end so the 50-ton gantry crane can work into yard areas at each end of the plant. A standard railroad spur also runs through the plant to deliver raw plates and haul out completed sections.

As shown in Table I, a larger portion of the tonnage is for main unit penstock linings, 18 feet in diameter with single sections about 20 feet long and weighing up to 48 tons. These huge lining sections are fabricated at the special plant erected by Western Pipe & Steel Co. at the Electric City railroad yard about 3 miles from the dam. The plates used for these sections, however, are planed and shaped prior to delivery to the Electric City fabricating plant described above.

The 6-foot diameter linings for the station service penstocks were fabricated at Birmingham, Ala., under a subcontract and shipped to the site in 40-foot sections. The smaller diameter made this feasible.

The main unit penstock linings consist of various sections with different wall thicknesses according to the particular location. The 23-foot upstream section made of ¾-inch plate contains a ⅝-inch thick hemispherical bulkhead to keep out water from the penstock until permanent bulkhead gates were installed. For certain special connections, plates up to 3¼ inches thick were used. Linings include such features as percolation rings and stiffener rings, drain outlets, bypass opening, 20-inch diameter manhole and holes tapped in the walls for future grouting around the lining. Station service penstock lining is 6 feet in diameter, made in 40-foot sections with wall thicknesses varying from ⅜ to 9/16-inch. Other general details are similar to those of the main unit lining.

Pump inlet linings are about 60 feet long made in two sections from ½-inch plate. Downstream section has hemispherical bulkhead equipped with 16-inch diameter manhole and a 10-inch diameter drain.

All linings are made of steel plate of firebox quality conforming to A.S.T.M. specifications No. A-89-33. These include 50,000 pounds per square inch minimum tensile strength, 27,000 pounds per square inch minimum yield strength and 31 per cent elongation in 8 inches.

Plates in linings are welded together with single-V butt joints where the welding is done mechanically and with double-V butt joints where welding is done by hand. The welding procedure employed complies with American Petroleum institute and American Society of Mechanical Engineers codes for unfired pressure vessels, which allow 80 per cent joints. However, resulting joints have been over 90 per cent, due to elimination of joint imperfections by use of X-ray examination.

Equipment in the plant is laid out in a well-planned assembly line to co-ordinate the various operations with minimum handling of the heavy sections. Plates for the linings are delivered at one end of the plant and the completed penstock sections taken out at the other end.

The main operations in fabricating a penstock section are: Fitting up the steel plate, welding the longitudinal joints on an automatic welding machine, welding the stiffener rings to the section and fitting the girth joints, welding the girth joints on an automatic welding machine, X-raying all of the welded joints and making repairs.

First step in assembling a section of lining is to set up on a special templet two semicircular plates which have been formed and edges machined in preparation for joining as shown in Fig. 2. This templet consists of several small concrete piers arranged around a circle. Slotted steel fittings are mounted on the piers and the curved plates are set in these slots to hold the plates

Table I—Lining Data

Lining	Approx. Length Feet	Number Required	Inside Diameter Feet	Wall Thickness Inches	Approx. Weight Tons
Main Unit	290	18	18	¾ to 1½	7650
Sta. Service	320	3	6	⅜ to 9/16	220
Pump Inlet.....	60	12	14	½	470

Linings

roughly in line. A hydraulic clamp is used to line up and fit the joints. This clamp weighs about 12 tons and consists of a heavy steel U with a hydraulic jack mounted on one arm. The jack operates a curved fitting which is set in between the joints of the U. A special 12-ton gantry crane handles the clamp. In operation, the jack is lowered over the sections to be joined, fastened to the plates and the clamp actuated to bring them into line. Then while the clamp holds them, the joint is tack welded. A spider made of adjustable pipe struts is tack welded inside the section to bring the walls into a true circle.

When the two longitudinal joints between the two plates have been tack-welded, the resulting circular section which is about 10 feet long is transferred to an automatic welding machine to finish weld the joints. After this operation, the spider is removed from the inside and the section is set up endwise on a special circular templet shown in Fig. 2 while the stiffener rings are attached to the outer surface.

These stiffener rings are steel plate about 10 inches wide and 1⅜ inches thick cut to fit around the

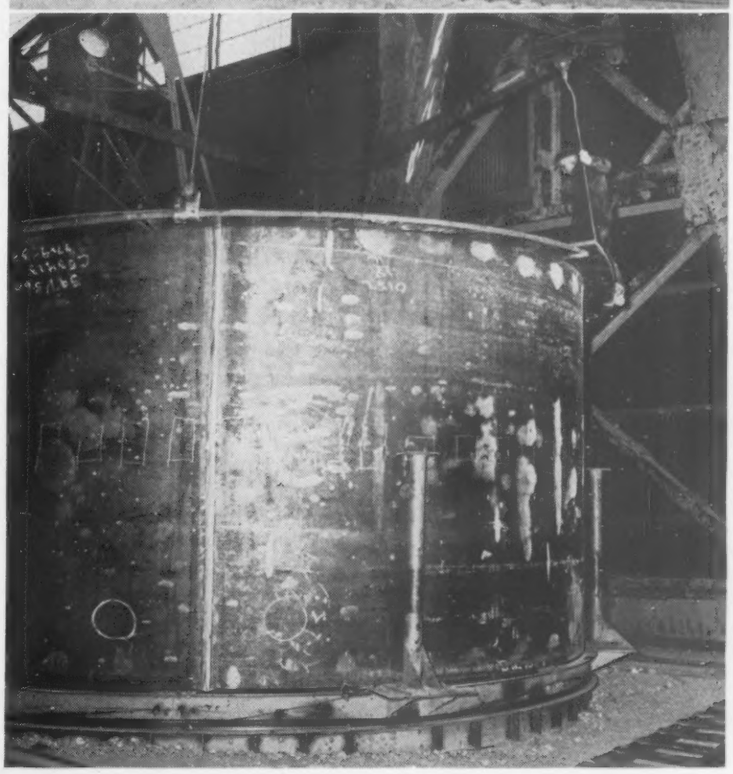


Fig. 1. (Bottom)—Plant erected especially for lining fabrication. Fig. 2. (Center)—Templet used in welding stiffener rings. Fig. 3. (Top)—Gantry crane handles lifting and moving in plant and at storage areas at each end. Photos courtesy American Chain & Cable Co., Bridgeport, Conn.

outside diameter of the lining section. Each ring is made up of six segments which are intermittently welded on the lining section by hand. The hydraulic clamp is used extensively in this operation to fit the ring to the lining. The stiffener ring maintains the circular shape of the lining and generally adds to the strength of the section. Each section receives a stiffener ring around it at the center point. It will be noted in Fig. 2 that adjustable vertical supports are supplied around the templet. These are used to position the stiffener rings for tack welding.

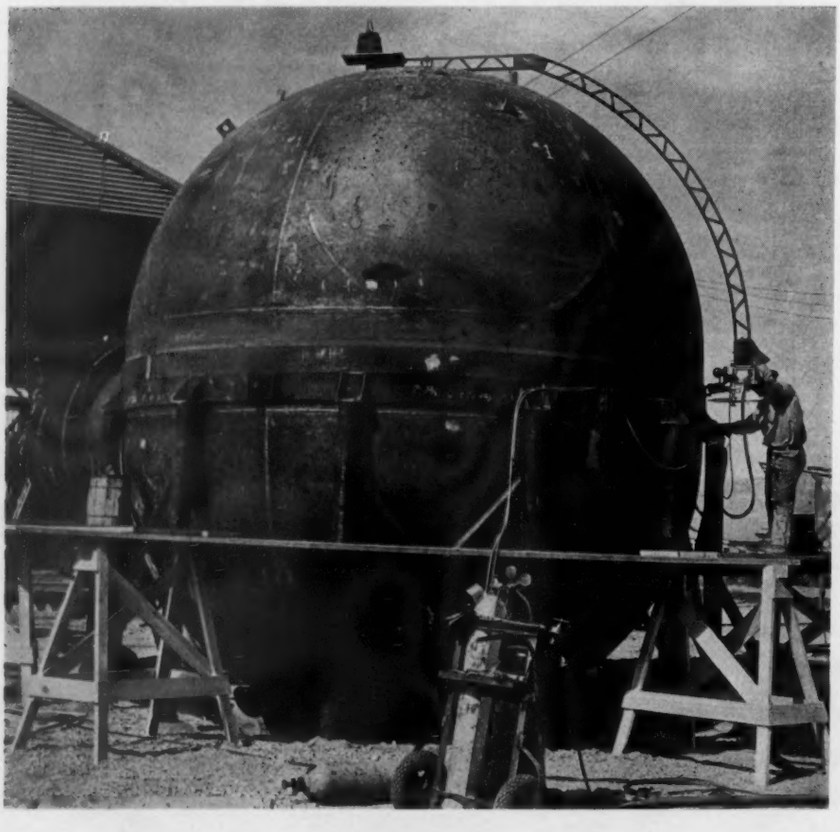
Next two 10-foot sections are butted together in a horizontal position on a set of rollers and the circumferential joint between the sections is fitted. Part of the seam is welded, the section turned on the rollers, the clamp is applied, the fit made and the tack welding continued. With the hydraulic clamp held horizontally above the sections, clamping and tack welding are repeated until the entire circumference has been tacked by rotating the section.

The resulting 20-foot section then goes to the automatic welding machine which finish welds the girth joint. This machine consists of a specially designed electric welding head mounted on a movable carriage. A copper chill bar and a series of motor driven rollers also are used. The lining section is placed on the rollers and the welding head operates in a stationary position above the section while it is rotated underneath the head. The copper chill bar is adjusted inside the lining under the welding machine to dissipate the heat and keep molten metal from flowing through the seam. As the section is slowly rotated, welding rod and flux are fed into the seam automatically to give a controlled, uniform weld.

After welding, the section is placed on a set of rollers in front of an X-ray machine and turned while every portion of the joint is X-rayed. The X-ray films are placed on the inside of the lining and are identified by lead numbers marked on the lining to orient the developed film to the lining. Exposed film is developed immediately and any imperfections found are chipped out and patched by hand. Subsequently the section is X-rayed again to confirm the soundness of the repair. All X-ray pictures are retained permanently by the government.

Next comes the hydrostatic pressure test. Each section lining must withstand a pressure in pounds per square inch equal to 190 times its wall thickness, equivalent to a stress in the section equal to about 20,000 pounds per square inch. This test is made using a heavy horizontal steel cylinder with a spherical bulkhead on each end and with a diameter about 6 inches less than the inside diameter of the lining sections. To make the test, the lining is mounted on a special carriage and slipped over this cylinder and the 3-inch space between the cylinder and lining section sealed off with a heavy gasket at each end. Water then is pumped between the cylinder and the inside of the lining until the desired pressure is reached. This arrangement reduces the tremendous end thrust that would have to be handled if the entire section were filled with water. During the test, pressure is applied and relieved three successive times.

Fig. 4—Bulkheads, welded together for hydraulic tests, are flame cut apart in this setup



Lining Painted with Coal Tar

If the lining successfully passes the pressure test, it is ready for painting. After it is buffed clean, it is given two coats of coal-tar base paint applied cold with a spray gun. After a final inspection, the section is stored until needed.

To move sections where the gantry crane cannot reach them, a cable is wrapped around the section and clamped to a stiffener ring. A small tractor pulls the cable, rolling the section to the point desired.

Most important in this fabrication work is the lifting and moving of the heavy sections. This is done efficiently by the 50-ton traveling gantry crane shown in Fig. 3. It has a span of 64 feet and about 40 feet headroom. This crane has access to any point in the plant and can deliver loads to the areas between the gantry rails that extend out at each end of the shop. The crane hoist has two drums, one carrying about 300 feet of ½-inch diameter plow-steel preformed wire rope for loads up to 10 tons. Four-part lines are used in lifting all loads.

On this job it is especially important to have a line that resists kinking for the loads are picked up quickly and if one of the heavy sections were lifted with a kink in the line, the line would be damaged badly if not completely ruined. For this reason preformed rope is used as this material is shaped during manufacture to the exact helical curve it will have in the completed cable, thus eliminating any tendency to kink. This rope also has been found economical to use because of the long life experienced. While hundreds of thousands of tons have been lifted in fabricating the lining sections, the main load line has been changed only twice.

Besides the fabrication of standard sections of linings, hemispherical bulkheads and other miscellaneous fittings are produced at the Electric City plant. Hemispherical bulkheads are made of hot-spun "orange peel" type plates, ⅝-inch

(*Please turn to Page* 62)

Electric-Tie Transmissions

New power or motion transmitting system offers means of tying movement together at two or more points without any mechanical connection whatever. System quite flexible but not complicated

By C. W. DRAKE

Manager
Gen'l Mill & Resale Section
Industry Engineering Department
Westinghouse Electric & Mfg. Co.

■ A MOTOR driving its load through an "electric shaft" opens a new field for power drives in many applications. While such units are well known as electric position indicators, the use of electric-tie or "synchrotie" transmissions is a relatively new development in power-transmission mechanisms. The synchrotie is a combination of two or more wound-rotor induction motors connected so a movement of one produces a similar movement of the other.

Where power is transmitted by any combination of shafts, gears, chains, etc., a synchrotie drive can be designed to accomplish the same results. The more complicated the mechanical drive the better are the opportunities and advantages of the electric system. While such units transmit motion or power from one point to another, they do not in themselves produce power, so quite logically they may be considered a true power transmission device.

While still so new that their applications are not completely known, electric-tie transmissions appear advantageous on various high-production machines and conveyor setups, for screwdown control in steel mills, to feed tools on boring mills and other machine tools. Also they are suitable for a large number of processing machines having different sections which must be synchronized for proper operation. In machine tool applications, perhaps the greatest feature of the electric-tie drive not obtainable with mechanical transmissions is the independent operation of the receiver as a motor when it is desired to make adjustments or when setting up work.

In general the characteristics of a synchrotie drive are as follows:

Synchronizing must be done while at standstill before line voltage is applied. The number of synchronizing positions of a unit is equal to half its number of poles.

Rotation may be in either direction and will act either to aid or to buck the unit's field.

Speed is a function of the number of poles, is limited to 2/3 the synchronous speed of the unit if rotation acts to aid the field, is limited only by machine losses of units if direction of rotation acts to buck the field.

Flexibility is exceptional. Speed increase or reduction from one unit of tie to another is possible by use of motors with a different number of poles or by use of gearmotors. Variable-speed ratios also are obtainable through use of frequency changers.

It is evident such a transmission has many possibilities.

The analogy between a synchrotie system and a line shaft is helpful in making clear just how such a system operates and what it will do and will not do. A length of line shafting will transmit torque or power from one end to the other, and one end will make exactly as many revolutions as the other under steady running conditions. It is well known, however, that there is a certain twist or angular difference between the two ends of the shaft when transmitting power and that this angle depends on the diameter and length of the shaft and on the torque transmitted.

A synchrotie system or electric line shaft operates in much the same manner but since the torque is transmitted electrically the mechanical limitations of shafting are eliminated. The two synchrotie units operate exactly in synchronism as do the two ends of the shaft, and the angular difference between the two units is a function of the size of the machines and the torque transmitted.

In its simplest form, a synchrotie drive consists of two duplicate wound-rotor induction motors as shown in Fig. 1. The primaries are connected to the 3-phase power supply and the rotors connected together. When connected in proper phase relationship with the machines stationary as line voltage is applied, there is no current in the rotor circuit. When one unit (the transmitter) is turned, the phase displacement between it and the other unit (the receiver) causes a current to flow between the machines, thus developing torque or turning moment.

Many of the problems involved in applying synchrotie drives are similar to those encountered in applying induction motors. However, certain factors peculiar to the system must be considered carefully. As mentioned before, the two units must be synchronized or connected to the line when both are at standstill, similar to engaging a jaw clutch. Where operating requirements do not permit both sections of a machine to be stopped for synchronizing, a friction clutch can be used between the receiver and its load or between the transmitter and its drive so the synchrotie can be energized at all times.

With both units energized from

From a paper presented at machine tool forum, East Pittsburgh, Pa., May 7, 1940.

a polyphase source, if the transmitter is driven in the direction it would normally run as a motor, the tie is said to operate "with the field." If the transmitter is driven in the opposite direction, the tie is said to operate "against the field." For each of these conditions, the receivers operate in the same relation to the field as the transmitters. Each direction of rotation has certain advantages and limitations.

Speed Must Be Held Down

When operating with the field, the maximum speed must not exceed 2/3 the synchronous speed of the unit—that is, 1200 revolutions per minute for a 4-pole 60-cycle motor. The synchronizing torque decreases rapidly above this speed, and maximum speeds below 1200 revolutions per minute may frequently be required in case of pulsating or fluctuating loads.

When operating against the field, speeds up to synchronous speed or above are permissible. At synchronous speed the rotor frequency is twice the line frequency, causing higher rotor losses. And in case of overload, the receiver tends to reverse and run as a motor to synchronous speed in the opposite direction. Under similar conditions when running "with the field," receiver speeds up in the same direction.

Of course there is a displacement angle between the transmitter and receiver, but angular displacement is seldom of much importance on drives which run continuously or on which large gear ratios are employed.

Two-pole machines will synchronize in one position only, and consequently are required for position indicators and similar applications. Four-pole units synchronize in two positions, six-pole in three, etc.

As a rule, units of 4-pole construction are used so operation "with the field" to a reasonable speed of 1000 revolutions per minute or so is possible. Two-pole designs may be required for certain applications but are more special and expensive.

Where a small angular displacement is necessary, 6 or 8-pole machines may be required.

Where the transmitter and receiver are to operate at different speeds, use of a different number of poles on the two units may prove advantageous instead of using gearing or mechanical speed changers. For instance, if the transmitter has six poles and receiver two poles, the receiver speed will be three times that of the transmitter. Thus the transmitter speed of 1600 revolutions per minute (against the field) gives 4800 revolutions per minute on the receiver, an application now in use on a wire-insulating machine.

Characteristic speed-torque curves of a typical synchrotie unit composed of two 5-horsepower 4-pole wound-rotor motors show that a torque of approximately 12 foot-pounds can be carried safely at 900 revolutions per minute with a displacement angle of approximately 20 electric degrees, 10 mechanical degrees in this instance. Maximum receiver torque when operating "with the field" in this instance is approximately 50 foot-pounds as compared with 30 foot-pounds operating "against the field." Consequently for reversing service the minumum value must be used in calculating starting torque, acceleration, etc. While the starting torque required by any machine is a fairly definite figure, accelerating torque is a function of the rate of acceleration. In case of a synchrotie drive, acceleration and deceleration are determined by the main drive. Ordinarily no difficulties are encountered along these lines.

Temperature Must Be Considered

As an example of a synchrotie application, consider the feed mechanism of a machine which requires 1 horsepower at 100 revolutions per minute and the same torque down to a speed of 10 revolutions per minute. The transmitter can be driven from the main drive motor at a speed of 1000 revolutions per minute, and consequently would operate at speeds from 1000 down to 100 revolutions per minute. The most economical arrangement is to operate the receiver also at 1000 revolutions per minute and reduce the speed to 100 revolutions per minute by gearing. Gear motor combinations work out excellently on such drives.

In selecting sizes of motors for synchrotie transmissions, safe temperatures must be maintainable at minimum speed. This means either a large machine must be employed or forced ventilation.

Numerous modifications of the simple drive shown in Fig. 1 can be made. Two or more receivers can be operated from one transmitter although they may be of different ratings and speeds. Such an arrangement may be advantageous for synchronizing various portions of one machine or synchronizing the operation of several independent machines.

Often a number of synchrotie drive units can be connected together to hold the main drives in synchronism where the machine driven is of such size as to necessitate applying power at several points. Here a synchrotie drive is used to hold the main drives together, and rating of tie unit is determined by the unbalanced load or torque between main drives. In such an installation, any tie unit operates either as a transmitter or receiver, depending upon load conditions.

The addition of a frequency

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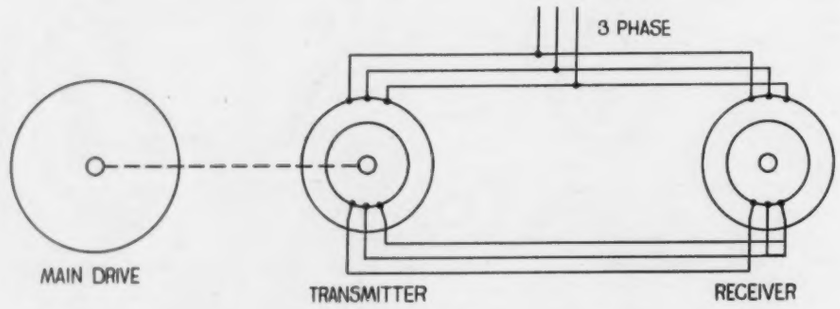

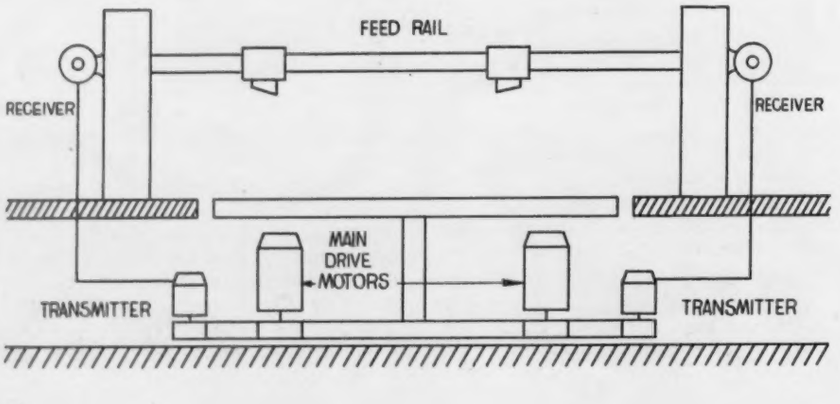

Fig. 1. (Upper)—Simple electric connections for synchro-tie. Stators of slip-ring induction motors connected to 3-phase line, rotors connected together. Fig. 2. (Lower)—Application of synchro-tie transmission to 40-foot floor-type boring mill where gearmotor-type receivers operate feed rail

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Fig. 1. (Left)—First step in sorting rivets after separation from other sweepings is to sift them according to diameter using sifters shown here

Automatic Sorting

Possibilities in salvaging materials with mechanical sorting equipment are indicated by an airplane builder who is saving $12,500 yearly through the use of ingenious sorting devices

■ AUTOMATIC sorting machinery often can be made to fit the particular requirements of a plant to simplify and increase the efficiency of many handling operations. Metal fabricators, for instance, are often faced with the problem of how to salvage efficiently large quantities of rivets, bolts, nuts and other sweepings from the floor. An outstanding example of what can be done along this line is the procedure developed at the airplane plant of the Glenn L. Martin Co., Baltimore, where Martin bombers and flying clippers are made.

Long ago Martin production engineers decided it was far cheaper to let lie those aluminum alloy rivets accidentally dropped on the floor than to have riveting operators take time out to recover them, especially since one of these workers is expected to drive around 1000 rivets a day. Neverthless these rivets swept up at the end of a day represented a real problem for their value averages over $1 a pound with some 60 pounds of light metal parts swept up daily, an annual dead loss of about $15,500.

In an endeavor to prevent some of this loss, a team of young men for a long time had sorted rivets by hand in an effort to reclaim some of this material but had not even been able to pay their way. Not long ago, production officials looked over this situation with a view to the possibility of developing automatic machinery to sort the salvage rivets. As a result, the tool design department devised the necessary equipment, and now most of the men formerly sorting are doing more important work.

First step in the automatic sorting system is to sort the rivets from the floor sweepings. This is not difficult as the aluminum alloy rivets are nonmagnetic and so are separated from the floor sweepings simply by passing an electromagnet over the collection, snatching out the extraneous steel and iron material from the floor sweepings. The residue is chiefly rivets of some 150 kinds.

First actual rivet sorting operation takes place in a series of sifters which sift them out according to diameter in much the same way that gravel is graded. As shown in Fig. 1, the mixture of rivets of all size is put in a steel box equipped with rods extending crosswise and spaced accurately a sufficient distance apart to permit rivets of a certain size to fall through. Rivets in excess of that size are retained in the upper sifter, and those falling through are subsequently sifted in similar manner until each of the various sizes has been sorted out.

As will be seen in Fig. 1, the lower section of the sifter rests on four rollers which run in two parallel tracks on a bench with rather abrupt rises at each end of the track. As the operator pushes the sifter back and forth, it is jounced severely as it reaches each end of the track, shaking the contents of the sifter to produce the

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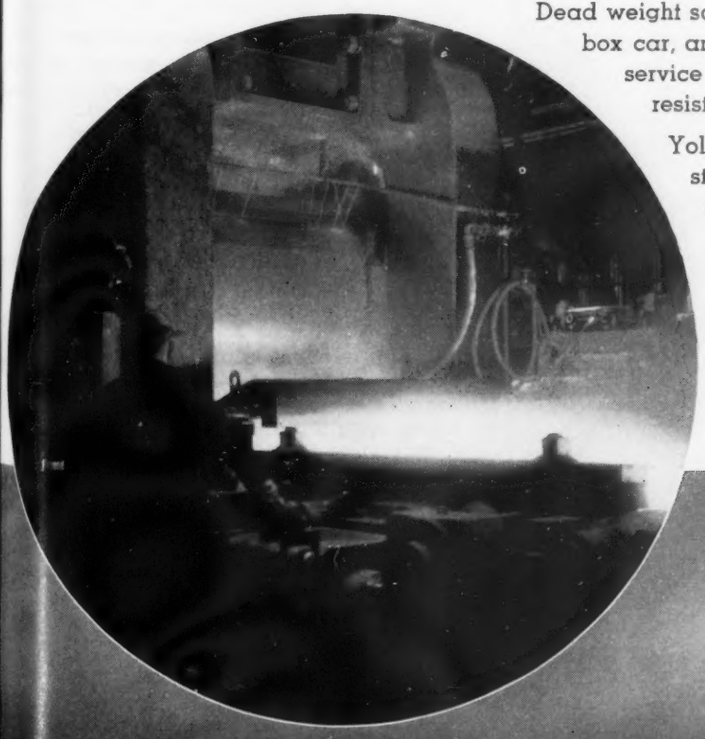
Dead weight savings total 3,015 tons or approximately 911 pounds for each box car, and 1,306 pounds for each automobile car. Normal life and service of these cars has been increased due to the high corrosion resistance of Yoloy—4 to 6 times greater than the carbon steels.



Yoloy was developed by Youngstown to provide increased strength with lighter weight. Yoloy can be welded by the arc, resistance or gas processes; has excellent corrosion fatigue properties, also greatly increased impact resistance over previously used materials.

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General Offices - YOUNGSTOWN, OHIO

Fig. 2. (Left)—This machine can be set to throw out either round head or flat head rivets, sorting the others according to length in the 13 bins around periphery of wheel

desired selecting or sifting action. Note sifters are built up from steel plate, are welded at the corners with selection or grading bars welded in to form a substantial unit which easily withstands the severe vibration encountered in this application.

With the rivets graded into many classes of diameters, there still is a wide variance of lengths and head shapes in each general class which must be sorted out. Accordingly the rivets next go to head-sorting device shown in Fig. 3. This unit separates round-head from flat-head rivets at an extremely high rate of speed. The rivets are fed automatically along a little track from which the flat heads slip into a small bin at one point while the round heads are carried on to another bin.

This head selector device shown in Fig. 3 works extremely fast, sorting 100 pounds of 5/32-inch rivets in 8 hours, for example. While the length-sorting device also can be made to toss aside either round-head or flat-head rivets while the other kind is being classified automatically into a dozen or so different lengths, it necessitates the subsequent operation of going back and sorting for length those tossed aside. Thus it was advisable to develop a head-selector device as its use speeds up the entire job without increasing the cost of doing the work since

(*Please turn to Page* 80)

Fig. 3—It was found more efficient, however, to first separate round head from flat head rivets in this machine before feeding them to the length sorter in Fig. 2. Although hand operated, this head selector has twice the output of the motor-operated length sorter shown in Fig. 2

Machine Tool Gears Are Checked Constantly

■ The importance of perfectly made gears in the machine tool industry is readily understood after viewing the procedure used by Gisholt Machine Co., Madison, Wis. Located in its gear production department is a modern, air-conditioned and soundproof gear testing room. Here, by means of the latest in gear testing and measuring machines, a constant check is maintained on all gears produced for its turret lathes and balancing machines.

Each new gear setup is checked thoroughly and the first gear turned out is sent to the testing room where it is checked on a gear charting machine for tooth spacing, tooth interference, eccentricity and tooth bearing surface. Both the tooth profile and pressure angle are measured on an involute measuring unit.

If the first gear produced does not pass these exacting tests, the machine setup is not approved until the second gear has been similarly tested, since the finish on the first gear may have been rough or final size reached before the finishing cut could be taken. Approval of the second gear allows the grinder to proceed with the run.

The testing, however, does not stop with checking the original machine setup, as errors can appear after the run is started. To guard against this, every tenth gear is subjected to the same tests. If a bad gear is found, the operator is instructed to make the necessary adjustments and all gears in the last lot often are checked. As a further precaution, the master racks and master gears are checked periodically.

The next operation is the lapping of all high points on the tooth profile of the gear.

Every single gear utilized in the headstocks of the lathes is checked under load with a mating gear on a speeder machine. The gears are matched before being assembled in the headstock as a unit.

Omission

■ In connection with the tubular steel domestic ironer described and illustrated on page 68 of the June 10 issue of STEEL, mention should have been made of the fact that exclusive manufacturing rights for the device are owned by Federal Fabricating & Steel Corp., Mineral Ridge, O., with MiLady Inc., 5-221 General Motors building, Detroit, being solely the sales agency. This fact is pointed out in a communication from G. W. Van Syoc, president of the Federal Fabricating organization.

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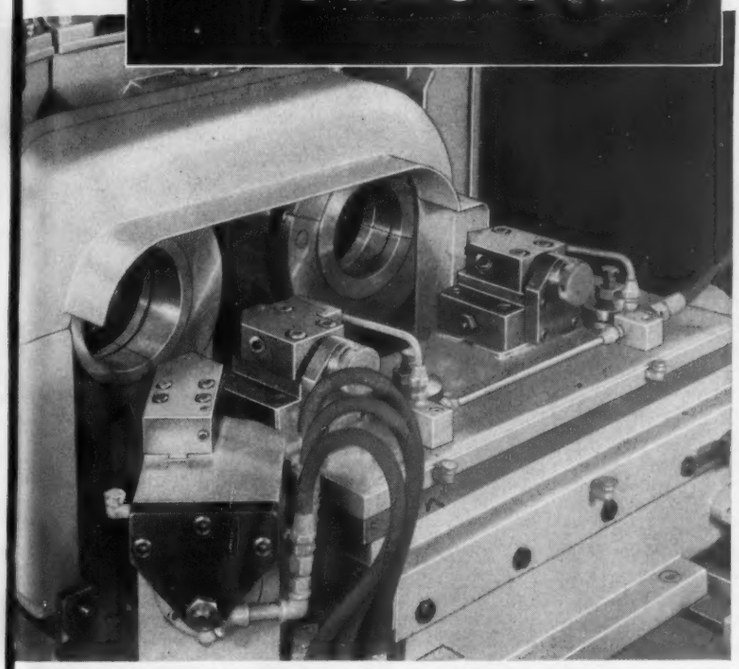

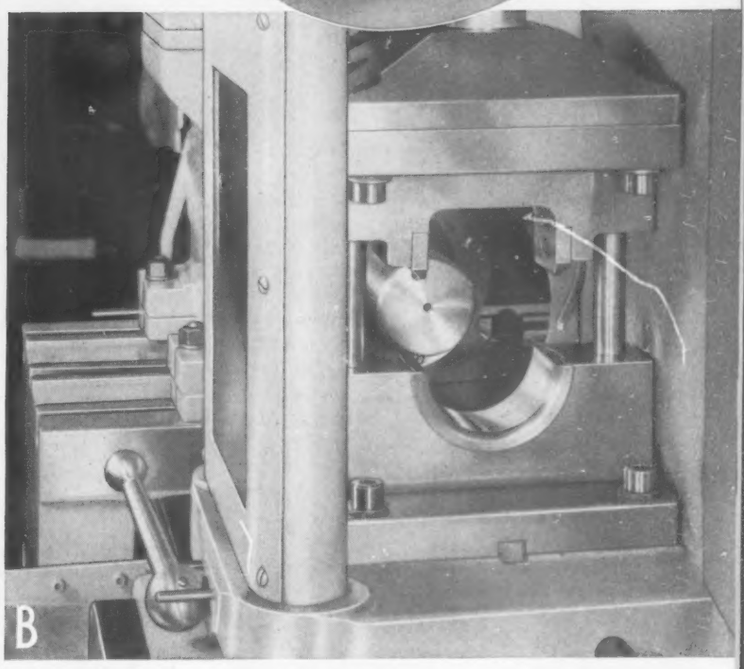

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Heating of Steel

Uniform heating of ingots in modern soaking pits conducive to high-quality slabs. Soaking temperature of 2300 degrees Fahr. and a free cleaning scale layer are highly desirable

PART I

By PAUL J. McKIMM
Cleveland

■ AN IMPORTANT phase of quality steel manufacture, is soaking pit heating. Every effort is usually exerted to select high-grade raw materials, as well as to insure a quality finished product and low rejections while at the same time soaking pit heating is more or less, or totally ignored. During the past decade, however, some steel manufacturers have stressed the importance of pit heating and a few made noteworthy installations. The results in connection with the quality of the resultant steel and the greater saving in fuel cost have been so noticeable that many obsolete pit furnaces will rapidly be replaced.

While design or construction of soaking pits or reheating furnaces has not been standardized nevertheless plans generally conform to individual plant requirements. Reference here is made to the paper, "American Soaking-Pit and Reheating Furnace Design and Practice" by F. M. Gillies and E. D. Martin[1].

The main function of this discussion is for the sole purpose of elucidating the effects of heating as they affect steel quality. Therefore, it makes no difference whether the design be one or two-way fired; regenerative or recuperative. With the reheating furnace design it may be single, double, triple or quadruple fired because the only concern here is that of the resultant material. Likewise any discussion of fuels is permitted to remain in the realm of the combustion or fuel engineer. Literature regarding fuels, their application and combustion is extensive. Hence, again it will be of little importance whether the fuels are solid, liquid or gaseous.

The quality of heating is of greatest importance insofar as it affects the final product by way of rejections in the plant or its performance in service such as surface or internal defects, as well as shape,

[1]Journal of the Iron and Steel institute (British) Vol. 138, No. 2, 1938, page 319 and the discussions in Vol 139, No. 1, 1939, page 527.

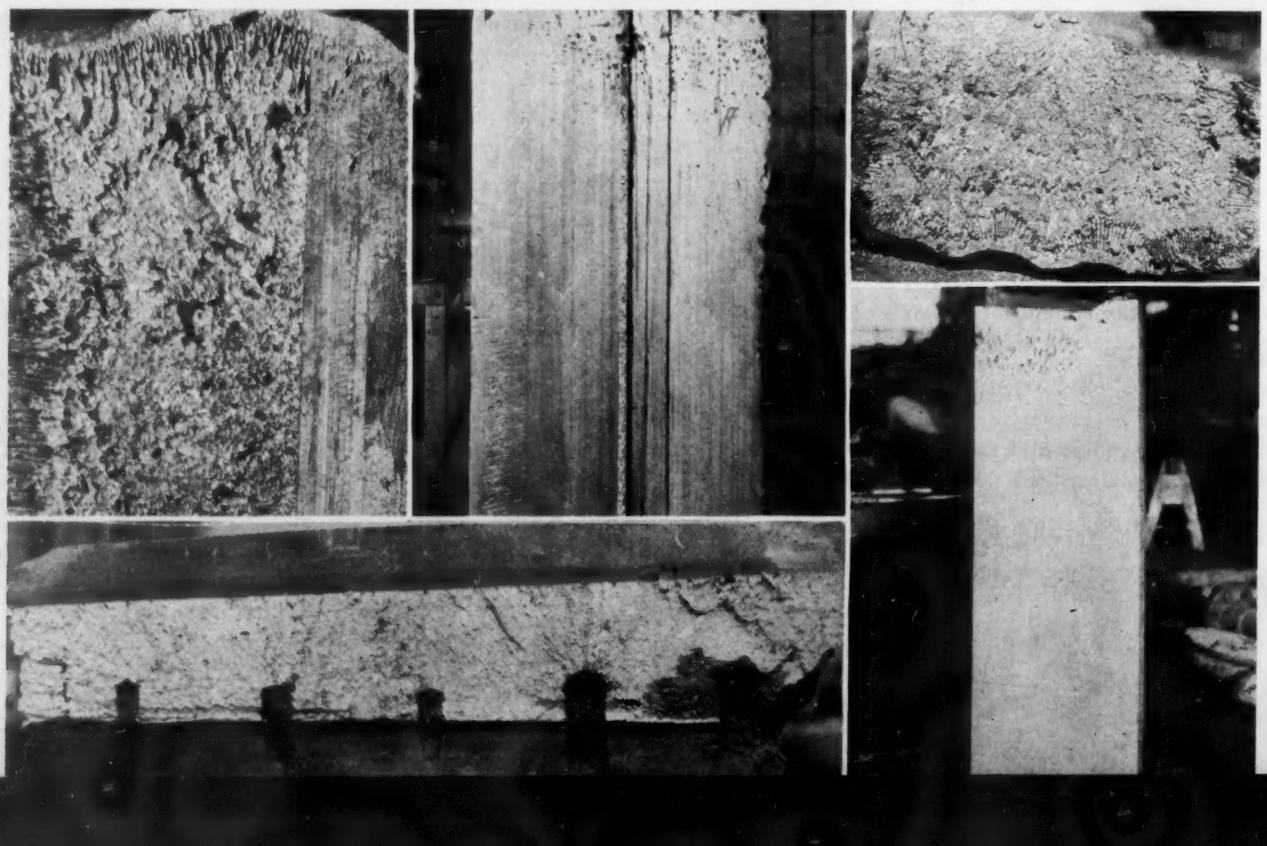

Fig. 1. (Top left)—Fracture of thin wall ingot with numerous cavities. Fig. 2. (Top center)—Though undesirable, this ingot with good heating can be rolled satisfactorily. Fig. 3. (Top right)—Cross section of ingot shown in Fig. 2. Fig. 4. (Bottom left)—Split ingot showing absence of honeycomb blowholes. Fig. 5. (Bottom right)—Quarter section of ingot free of inner cavities

LESS COST PER TON OF STEEL ROLLED plate

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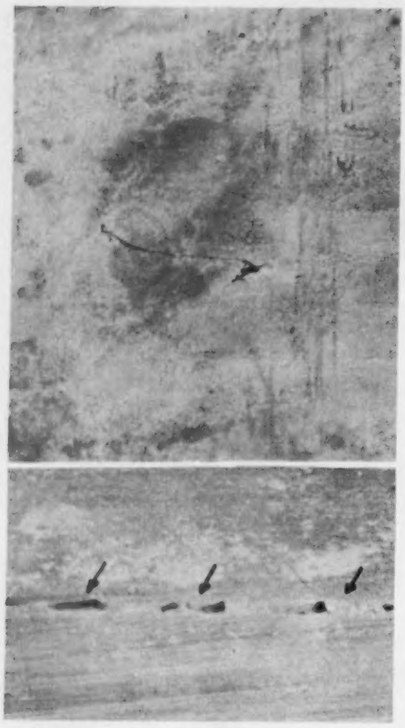

Fig. 6. (Above)—Crack on surface of slab intensified by low-temperature rolling. Fig. 7. (Below)—Strip made from slab shown in Fig. 8. Heavy tear has been rolled out and lapped over

gage, physical and grain characteristics. It is not practical to have poor heating and low fuel cost but as heating improves fuel cost automatically drops to a minimum. Hence, it suffices to say that the best and lowest cost heating will be accomplished when furnace design, fuel, and means of application and control are simplified; that is, the easier it is for the heater the better the results, and in this respect it is evident that under certain conditions one design is better than another and/or for certain plant conditions.

In the following data many different furnaces and single or mix fuels (coke gas and producer gas, coke gas with tar, straight coke gas, straight producer gas etc.), were employed, and in a few instances results were duplicated in electric heating furnaces.

If it merely is desired to roll an ingot of general analysis to slab or bloom dimensions (not including open-hearth iron, wrought iron, the stainless group or some few special analyses) it can be accomplished at most any temperature range even as low as approximately 1900 degrees Fahr. this being about as low as equipment would stand. The maximum temperature would be when steel is lost due to melting away. A wide variation in temperature of the mass could exist and yet the section would meet size specification but the quality would be sacrificed. This condition would promote many types of defectiveness and rejections and often in the final product the cause cannot be determined; many times it is attributed to steel manufacture or processes that are not at fault.

Heating as will be herewith discussed is that conforming to a good practical common-sense process, namely that the steel be thoroughly soaked out at a good rolling temperature and that it contain a complete jacket or layer of scale. First consideration will be steels conforming to the lower carbon order, i.e., ladle carbon analyses 0.06 or 0.08 per cent and under, and up to about 0.30 per cent carbon. The type of steel may be either effervescence (rimmed) or completely deoxidized whether the deoxidizer be silicon, aluminum, a combination of silicon and aluminum or others (zirconium, manganese, etc.). The general heating practice will be the same. The proper rolling temperature will be that approaching 2250 degrees Fahr., the author preferring a soaking temperature of 2300 degrees with a scale layer that is free-cleaning in the early passes of rolling. Certain opinions exist as to scale conditions; some maintain that steel can be scaled while others hold that if washed free of scale identical results will be obtained.

The condition of the ingot as received from the open-hearth department is important. Good quality ingots can be supplied consistently. Thin-walled ingots are more or less difficult to heat depending on their thinness; if the blow-holes extend to immediately under the skin (that is, the layer of metal formed ahead of the pour metal of the ingot) the ingot cannot be successfully heated because the cavities will break through, damage the surface and necessitate conditioning. There is no excuse for such ingot condition. A cross section fractured through the thin area of such an ingot is shown in Fig. 1. The honeycomb-like cavities extend in many cases through the entire surface.

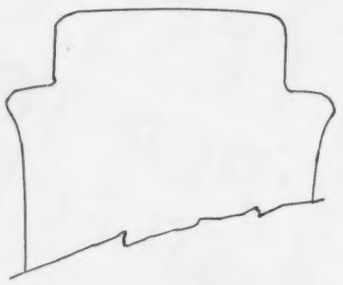

Fig. 10—Sketch showing character of overfilling at roll collar

Fig. 2 depicts an ingot that is considered thin and unsuitable. A solid area of metal exists between the ingot surface and the nearest blowhole of approximately 1 inch. With good practical heating this type of ingot can be successfully processed. Fig. 3 shows cross section at thinnest area of ingot represented in Fig. 2 and it can be noted that 1 inch or more metal exists to the nearest cavity.

Fig. 4 is a split ingot that is free

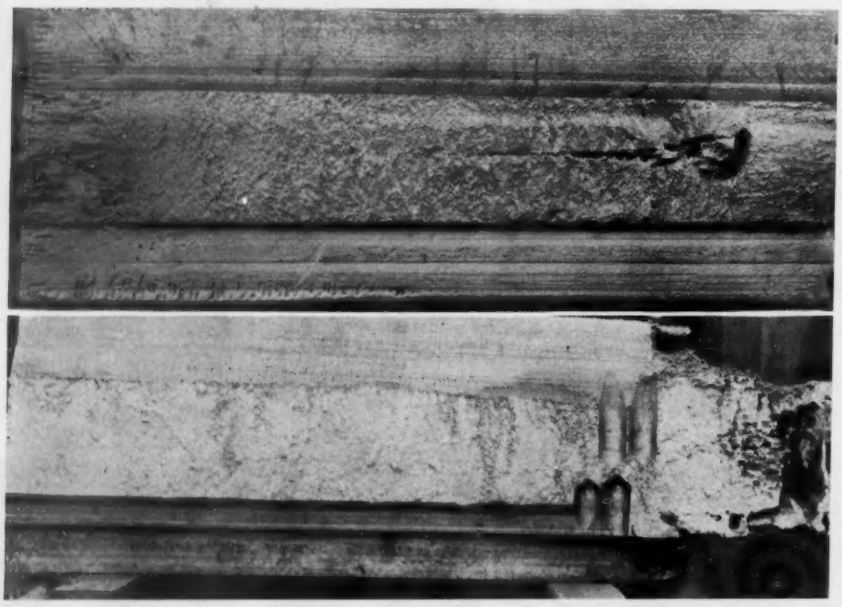

Fig. 8. (Top)—Split killed steel ingot with spongy wall area. Fig. 9. (Bottom)—Killed steel ingot that can be produced consistently

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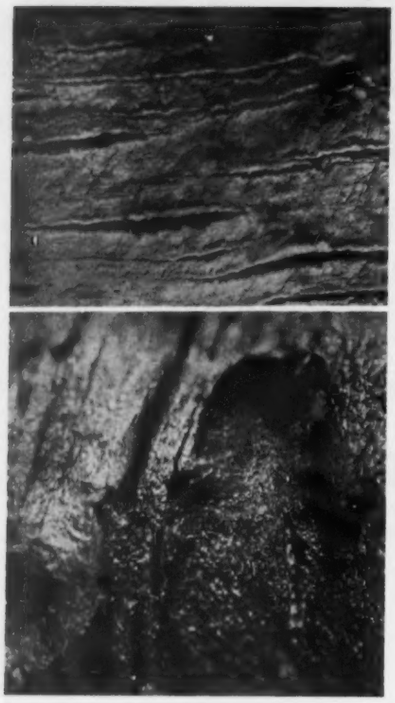


Fig. 11. (Above)—Photomicrograph of hair-line seams. X4½. Fig. 12. (Below) —Photomicrograph of corner defect. X4½

of the honeycomb type of blowholes. It shows, however, extremely small cavities in a row extending 8 inches in from the surface and is representative of an excellent practical rimmed ingot. Fig. 5 represents a quarter section of an ingot that is free of the honeycomb or inner row of cavities. Figs. 1 to 5 inclusive are of the effervescent or rimmed grades. Any respective quality can be produced at will and that shown in Figs. 4 and 5 can be produced consistently.

The split ingot, Fig. 8, of the killed type, which was improperly made, is a poor ingot to heat because of the cavities existent in the wall area towards the two adjacent surfaces. This spongy condition is also generally encountered with improperly handled semikilled steel. Fig 9 is representative of a good killed ingot and one that can be consistently produced.

Hot Working of Steel

Allowing that higher-carbon steels, say forging and high-carbon alloy steels, can be rolled at considerably lower temperatures than those of the lower-carbon order and because of the extensiveness of a general discussion of this subject the rimmed ingots previously exhibited will be explained first, avoiding as much as possible all that is academic and theoretical and citing some outstanding characteristics. The chemical compositions of the rimmed ingots conforms to: Carbon, under 0.10; manganese, 0.30 to 0.35; phosphorus, under 0.010; and sulphur, under 0.030 per cent respectively.

The most common cause for rolling ingots, slabs or blooms cold is inadequate heating capacity and taking the steel from the heating units before it reaches suitable rolling condition. The seriousness of this condition greatly increases with the increased number of cold ingots charged although ingots charged hot or cold can be properly heated and soaked with the required time factor under suitable furnace atmospheres. Say for example it requires two or three hours to heat ingots charged hot; it may necessitate seven to nine hours to obtain the identical quality of heated ingot with those charged cold.

Effects of Rolling Cold on Cracking

Cracking here considered is not that commonly classified as "hair line seams" but an actual breaking of the ingot either across the thickness and/or width and varying in number from one or a number of small cracks to one or a number of large ones even extending across the face or edge of the ingot. This characteristic is definitely an inherent condition due to steelmaking practices only and will not occur with properly made steel. Nevertheless with steel possessing this weakness, rolling at low temperatures will intensify the cracking condition and to a lesser degree if hot, but will not eliminate it. Heating, therefore, cannot be held responsible. Fig. 6 shows how this type of crack appears in a slab.

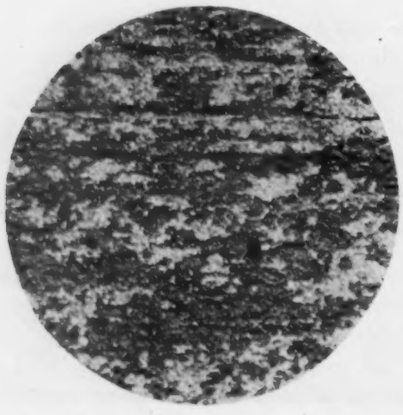
Requires Surface Conditioning

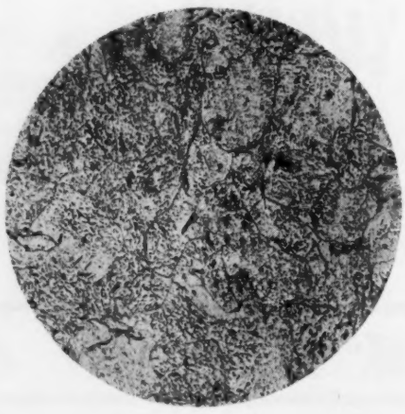
This particular crack is not so large but often the V or W-liked crack formation extends nearly across the width of the slab. In any event surface conditioning, either chipping or scarfing, is necessary or rejection of the final product will ensue. When slabs possessing this type of defect are rolled into strip in the same direction as the slab length, the defect will be somewhat localized necessitating only several lengths to be rejected. When a slab having the same defect is rolled broadside, that is, where the width of the slab becomes the length of the strip, the defect will be in the form of a snake and the number of lengths rejected will correspond to the area affected from edge to edge of the slab. If the defective part covers 70 per cent of the slab width then that percentage of the length of the strip will be rejected. As stated before there is no excuse whatsoever for this condition to exist in steel.

Results obtained in the hot strip made from the defective stock shown in Fig. 6 when the material is straight rolled, are shown in Fig. 7.

Various articles dealing with the study of plasticity of steel have appeared in foreign publications[2].

Fig. 13. (Left)—Photomicrograph of chip taken from a slab. X100. Fig. 14. (Center) — Photomicrograph of grain structure adjacent to area under chip shown in Fig. 13. X100. Fig. 15—Example of hair-line seams and strain-lines. X15





[2] P. Ludwik: Elementeder technologischen Mechanik Berlin, Springer 1909.
Mohr: Berlin Werkstaffaussch, v. d. Eisenhuttenwessen 1925. No. 56 page 2.
P. Oberhoffer: loc. cit. page 383-4.
G. Tammann: Lehrbuch der Metal-

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Rolling at low temperatures is most deleterious to steel because it is a most fundamental feature influencing plasticity. Deformability depends essentially on the temperature of the mass; temperature differential, principally between surface area and core; and, the system of process loading, chiefly the method of pass arrangement or drafting or the percentage of reduction. Therefore, with higher temperatures and proper soaking the plasticity is greatly improved so that greater deformation is permissable without injury to the steel; or, if two separate masses (ingots, etc.,) of high and low temperature be rolled with the same draft, the hotter ingot can be processed without injury while that at lower temperature will be damaged either beyond salvaging or necessitating surface conditioning.

Soaking is equally as important as temperature mostly because it is the only means of softening, and hence, improving plasticity. This is true in an ingot, slab or bloom that possesses a wide temperature difference where the surface area is heated to a much higher temperature than the core; or, in an ingot uniformly heated but at slightly lower temperature than normal where a temperature difference develops by the surface chilling down because of its contact with the table rollers or excessive cooling water, in which event the core is the hotter. Considerable different characteristics exist between the two types of temperature variation. The one heated with the hotter surface area and usually heated rapidly and/or more rashly has a more gradual decreasing temperature from the surface inward while the chill surface generally possesses a thin layer or shell having a sharp demarcation of temperature. The deformation of the section having the higher temperature is more limited than that of the lower temperature; hence the velocity and extent of deformation may be lower than the limit of velocity of the hotter area but higher than that for the cooler area and thus cause a fracturing of the lower temperature area. If the core is cooled below certain limits minute internal fissures will develop which will cause failure in drawing the material either in testing or forming. If the surface area is cooled the most common defectiveness is fine breaks or "hairline" seams. Some of these may be visible to the naked eye; others may be so fine that they cannot be detected by inspection and may be completely processed, only to have the material rejected or fail in performance. Surface chilling is far more detrimental because of the sharp demarcation between the thin "shell" area and the main body of the cross section. Hair line seams in the shell will not only increase greatly in number and extent but the shell also will tear in minute fissures, transverse to the rolling direction often causing defects of several commonly known types of "arrowheads" and open surface that will not heal-up in further processing. In this connection rolling pressure according to a given system of reduction is imperative; ingots at a normal rolling temperature and uniformly soaked are reduced at lower pressures.[3]

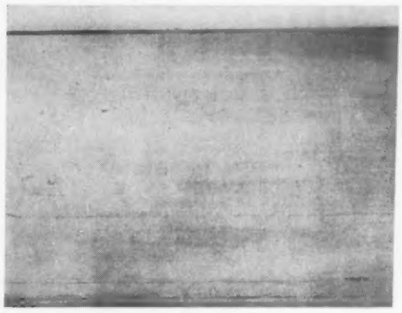


Fig. 16—Excessive seams shown on lower edge of strip

Furthermore, where surface temperature is low this portion as well as the surface portions of a lower temperature ingot will promote spreading which again influences the development of hair line seams as well as other defects. The action apparently is that particles of material in the center flow in the direction of rolling and to a slight degree in the width direction. As lower temperature stock is rolled the particles migrate out towards the edges or corner areas so as to have the greatest spreading in relation to elongation. This increase in migration is retarded somewhat because the particles are carried along due to internal cohesion of the larger mass representing that which is elongated. This spreading nevertheless establishes unfavorable stresses. In this overstressing there is a lack of continuous flow in one plane because particles are continually moving outward in an opposite direction. This spreading can reach extensive proportions, even as much as 6 or 8 inches, at the midsection of the ingot, especially with a mill having a stand of bullhead rolls turned with edging passes; with a slabbing mill equipped with vertical rolls there is a tendency of crowding the vertical edgers.

Another feature, which is intensified when low-temperature ingots are being rolled, is the extent of overflow or overfill at the roll collar when edge passing. This will be greatly increased with increased reduction or the number of passes in each given turn of the ingot, i.e., too great a reduction or too many edging passes before the bullhead or face pass on the slabbing mill. In this case the formation of hair-line seams is greatly increased and also the trend in the formation of edge seams in the finished strip or towards the corners in bars and also existant in rounds or other sections. Besides these, the overfill under certain conditions dependent on its shape, may be lapped over necessitating the loss of the final product. Even if the overfill flattens over and allows a solid surface besides the hair-line seams, minute check marks often

(*Please turn to Page* 75)

[3] *Stahl und Eisen*, 1924, vol. 44 page 858.

lographic. Leipzig, Voss. 1923 page 57.
F. Korber: Wekstoffaussch, v. d. Eisenhuttenwessen, 1922 No. 15.
Puppe: *Stahl und Eisen*, 1916 vol. 36 page 1185-6.
Leon Geuze: Traite theorique et pratigue du Laminage du fer et de l'acier Paris. Beranger 1921.
K. Rummel: *Stahl und Eisen*, 1919 vol. 39 page 237, 267 and 285.

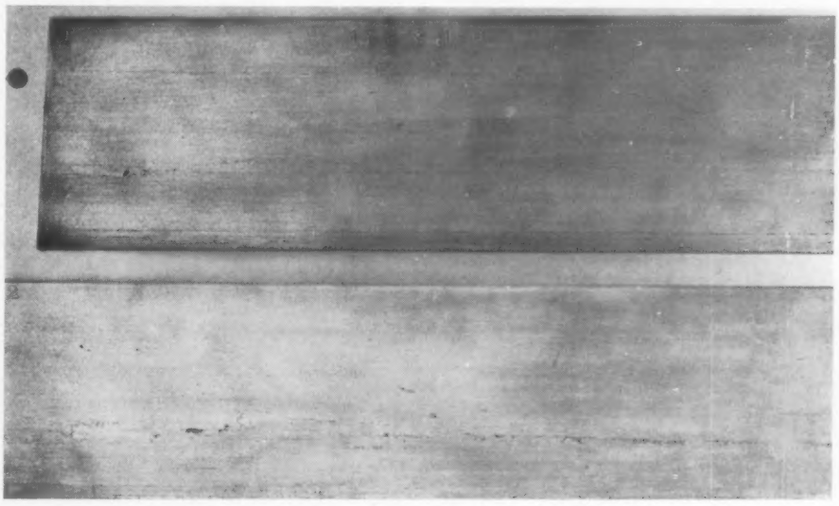


Fig. 17—Hot rolled strip showing edge and hair-line seams

Penstock Linings

(*Concluded from Page* 46)

thick, manually welded. In making the pressure test, two bulkheads are welded together to form a sphere. After the test, the sphere is cut in half using a special oxyacetylene torch cutting setup shown in Fig. 4. Fittings such as manholes, drains, etc. are welded to the sections by hand.

Because quite a considerable amount of the welding is done manually, all welders are given qualification tests, the welds being examined in a testing laboratory at the plant.

Approximately 50,000 lineal feet of welding has been done in fabricating the penstock linings. Of this amount, about 30,000 lineal feet has been done automatically. About 300,000 pounds of welding electrodes has been used and about 1,000,000 kilowatt hours of electricity has been consumed in welding and other shop work.

Work was begun by Western Pipe & Steel Co. on this contract in April, 1938, and will be completed early this summer.

New High-Carbon, High-Vanadium Tool Steel Is Announced

■ A special high carbon, high vanadium tool steel suitable for a wide variety of uses, ranging from heavy hogging cuts to fine finishing operations is announced by Bethlehem Steel Co., Bethlehem, Pa.

The new steel, known as Red Tiger, is a departure from standard practice in that the carbon content has been increased to give extra hardness, an average Rockwell of 65 to 68 C after heat treatment. This has been attained without excessive brittleness.

Provides a Fine Finish

According to physical tests the impact properties of the steel are approximately the same as those of standard carbon 18:4:1 high-speed steel. Its shock resisting properties permit its use on intermittent cuts without danger of breaking the tool. Due to the high-carbon content, it also lends itself to fine finishing operations, producing a surface comparable with that obtainable with the old type finishing steels which are run at low speeds.

The analysis of the steel is approximately:

Analysis	Per Cent
Tungsten	18.00
Chromium	4.00
Vanadium	2.5
Molybdenum	0.60 to 0.80
Carbon	0.1

Standard heat treating without any extra precautions is used. The following is the recommended treatment. Preheat the steel slowly to between 1500 and 1650 degrees Fahr. and soak thoroughly. Next transfer it to the hardening furnace and heat rapidly to between 2350 and 2375 degrees Fahr. and oil quench immediately to about 200 degrees Fahr. Allow the steel to cool to room temperature and then charge into a tempering furnace and draw to 1050 degrees Fahr. This hardening procedure should give the Rockwell hardness mentioned above.

The principal applications include machining, both roughing and finishing cuts for all general purposes, such as heat-treated railroad car wheels and axles, cast iron and heat-treated alloy steel. In machining heat-treated car wheels a speed of 16 feet per minute has been used with a 7/16-inch depth of cut and a feed of 7/16-inch.

Improves Rapid Method For Determining Tin

■ AN IMPROVEMENT in the rapid chemical method of tin determination has been found to be more accurate than that given in the article on "Residual Tin in Steel" by Paul J. McKimm, on page 69 of the May 13 issue of STEEL. The improved method as presented by the author is as follows:

Tin in Iron and Steel

Dissolve: 5 g of the sample in 50 ml of HCl (1-1) in a 500 ml Erlenmeyer flask.

Or Transfer: the solution left from the sulphur determination to said flask. (In the case of pig iron, filter this solution through a common paper by means of suction.)

Dilute: the solution to 200 ml and bring to a boil.

Add: ammonia from a dropping bottle until a slight but permanent precipitate forms. Too much precipitate defeats the object sought, i.e. the elimination of iron.

Remove: from the plate.

Add: 2 g of granulated zinc.

Digest: at the boiling point for 15 minutes.

Decant: the solution through a 9 cm common paper, without washing.

Return: the paper to the flask.

Add: 75 ml of HCl (conc.) and boil until the metallics are dissolved and the paper completely disintegrated.

Dilute: to 250 ml and add 5 pieces of electrolytic iron ½" squares and 7.5 ml of antimony solution.

Or Add: 0.15 g of finely divided Sb and no iron.

Heat: to boiling and pass a stream of N_2 or CO_2, freed from H_2S by Na_2CO_3 by means of a glass tube and a 2-hole rubber stopper.

Continue: the boiling and current of gas for 20 minutes after the solution becomes colorless.

Cool: the solution under a jet of water without stopping the current of gas which should pass rapidly while the flask is cooling to prevent the air from being drawn in.

Filter: through a cotton plug into a 500 ml flask containing a few grams of sodium bicarbonate.

Add: 3 ml of starch solution.

Titrate: at once with a standard iodate solution such as used for sulphur in steel. (1 ml equals 0.005 per cent sulphur on a 5 g sample.)

A blank should be run and deducted, using a tin free sample such as iron by hydrogen, or electrolytic iron.

Standardize the iodate as follows:

Dissolve: 0.6 g of C. P. tin, dilute to 100 ml in a graduated flask and mix. Pipette 1 ml portions, add to several blanks, and run by the method outlined above.

1 ml of this tin solution equals approximately 0.0012 g Sn. 1 ml of iodate solution equals approximately 0.0012 g Sn.

Notes on Tin Determination in Iron & Steel

Antimony Solution: 3 g Sb dissolved in 100 ml H_2SO_4 (conc.) and diluted to 150 ml.

Antimony, powdered: put desired quantity of granulated Sb into a pebble mill and run it for 24 hours.

Granulated Zn is merely added as a safety precaution to precipitate any Sn which may not come down with the iron hydroxide. It also has the effect of keeping the iron in a reduced state.

Effect of Omitting Metallic Fe

Tests to determine the percentage of Sn using Sb only, for reducing steels containing 0.09, 0.11, 0.15 per cent Sn, respectively, were rerun using Sb precipitated chemically with an iron rod and the results obtained checked closely.

0.6 g of Sn was dissolved in 30 ml of HNO_3 (1-1) and taken just to dryness to drive off all HNO_3. The metastannic acid so obtained was heated several days with 75 ml of HCl (conc.) to convert to stannic acid and dissolve. The solution diluted to 100 ml with HCl and 1 ml portions used. 1 ml of this solution is equal to 0.006 g Sn. Using Sb about 60 mesh as purchased, no Sn was found on three portions. After grinding the Sb in a pebble mill for 24 hours the following results were obtained:

	Grams
Tin present	0.00600
Tin found (average 6 samples)	0.00608

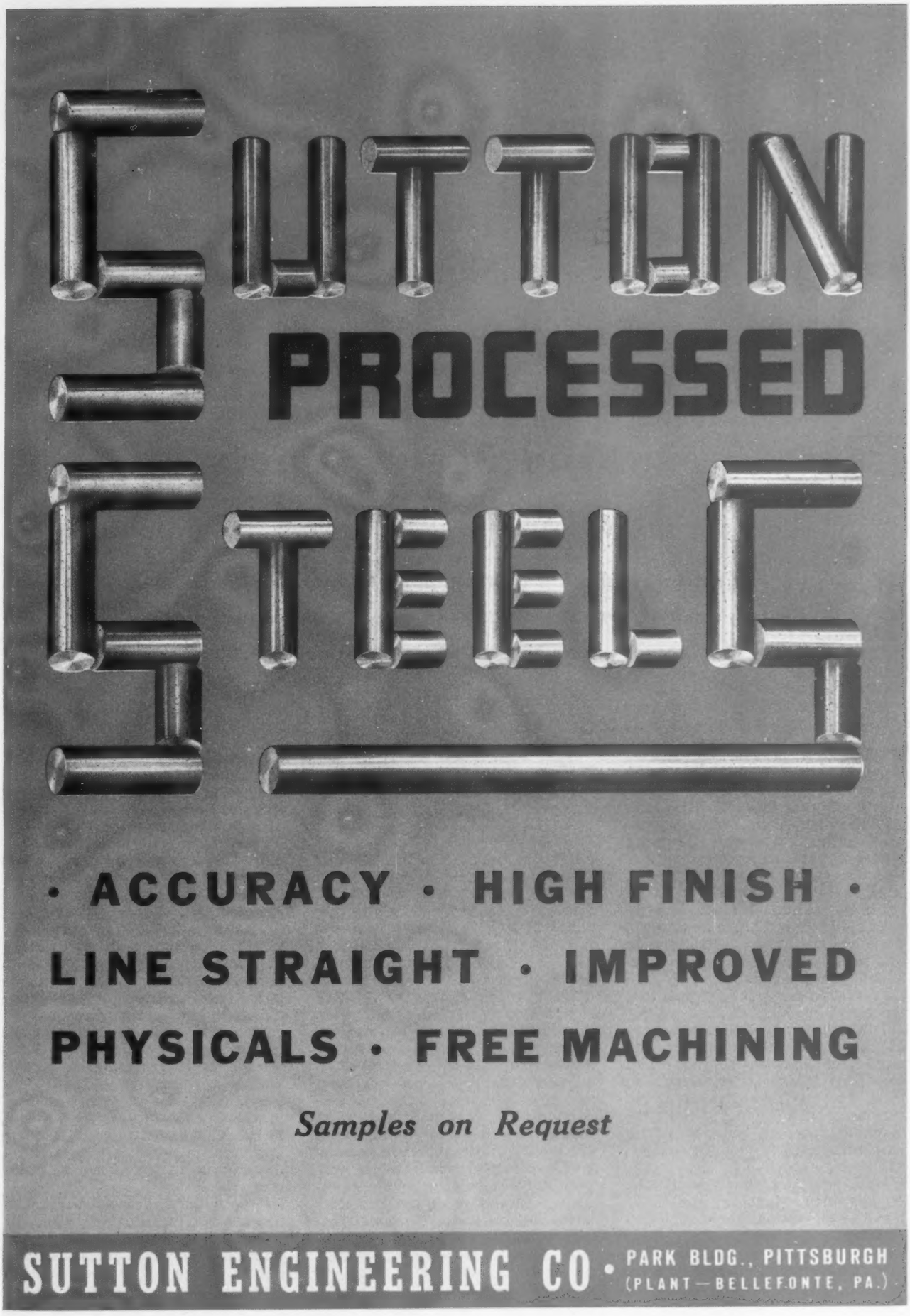
Effect of Chromium

	ml Iodine
Blank used	0.7
Blank & 0.005 g Cr	0.9
Standard	6.2
Standard and 0.005 g Cr	6.3

Effect of Oil

	Per cent tin
Steel ran	0.020
Check ran	0.024
Check and 2 drops of oil ran	0.024

The oil used was the same as that employed for oiling sheets.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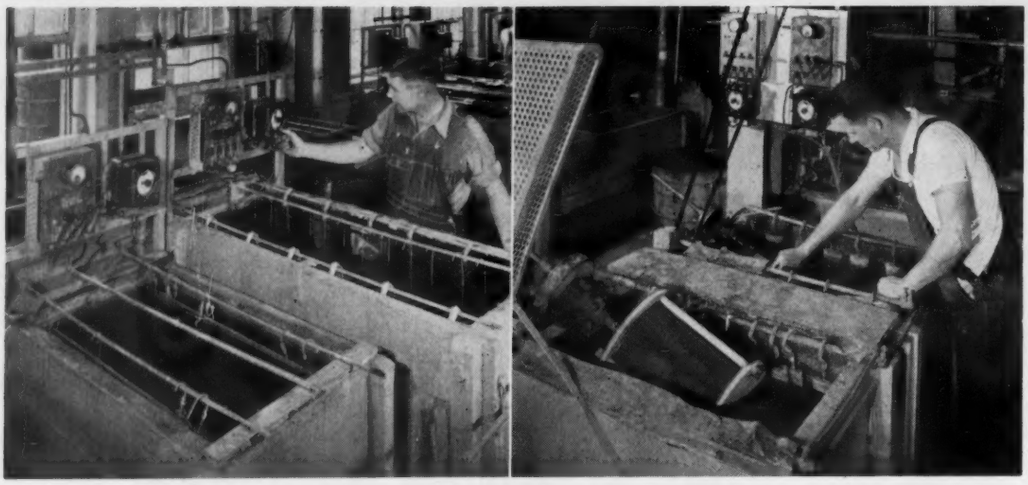

Ampere-hour meters control current application in both still and barrel plating

Making Meter Parts

Die costs cut by designing stamped parts to use same blanking dies. Gears, punched from strip brass, are staked to hubs automatically. Totalizing ampere-hour meters afford positive control of plating

By GEORGE RALPH
Process Engineer
Sangamo Electric Co.
Springfield, Ill.

■ SEVERAL practical production problems are handled quite ingeniously in the metal forming departments of Sangamo Electric Mfg. Co., Springfield, Ill., manufacturer of totalizing watt-hour and other electrical metering equipment. For example, on stamped parts formed from sheet or strip steel, which require no additional machine processing except drilling and tapping, these operations are performed in the press department to save rehandling expense.

Several parts are so designed that the same blanking die is used for all. The differences lie in the gage of metal, punching, spacing and number of the holes, or other minor variations in second operations to meet the wide requirements of the various models. This permits the blanking press to be operated on long runs with the blanks finished as needed.

Most of these parts could be formed in a single operation by a more complicated combination perforating and blanking die. However, each of the dies would be much more expensive and involve greater set-up expense. By blanking as a separate operation, die cost is materially reduced. Also the blanking press operates for long runs with a single set-up.

Most other duplicate work produced in large quantities is manufactured in progressive or multiple dies which form, perforate and blank in a single or consecutive unit in a single press run. More complicated parts, however, are press formed in two or more operations.

Most parts are formed from strip, especially parts for armatures, magnets and coils which must be perfectly flat so they will fit in close contact when assembled. These parts are piled from the press in containers for handling to preclude any possibility of bending which might occur from the weight of those parts above if piled loosely in a tote box.

Setup man keeps an end section of punched strip from each part filed on a pattern board. These strips are stamped to identify part number, die number, etc. The setup man uses these strips to check his setup and dimensions of material on hand for the production order.

Series coils are built up of wafers of high silicon steel, perforated and blanked from strip in a progressive die. These wafers must be absolutely uniform in composition and in all dimensions. The wafers are, therefore, strung on a guide rod holder and kept in sequence as formed. This keeps wafers together in consecutive order as punched from each strip and consecutive strips from each heat of steel as received, thus assuring more uniform composition and dimensions, even to variation from die wear.

Most exact punching is a 100-tooth gear from 26-gage brass (0.016-inch). One of these gears is used in a gear train in all meters manufactured. Number of teeth in other gears varies with purpose and requirements of each metering instrument.

After punching, each gear has a hub staked in. For the 100-tooth gear, this operation is performed on a machine which feeds gear and hub, positions and stakes them automatically. For staking other gears, an adjustable unit is used

with gears and stakes hand fed and positioned.

In assembly of shunt magnet by riveting together U-shaped blanks, all surface must be in perfect contact and under even pressure. To obtain this, the six rivets in the magnet are set simultaneously by hydraulic pressure at 2300 pounds per square inch. The blanks are handled carefully to prevent bending in forming and handling. Finished magnets are placed in compartment tote boxes or trays to protect and keep separate.

Compartment trays are used for handling practically all insulated and impregnated parts and delicate mechanism assemblies, such as the clock or gear train. Trays for assemblies to be impregnated, such as the magnet coils, are provided with loose masonite board covers to protect parts from dust during temporary storage and passage through the shop.

All Metal Parts Are Plated

Protection against corrosion of metal parts of totalizing watthour and other types of electrical metering and associated equipment made at Sangamo is of especial importance in that the meters are exposed, although encased, to all types of atmospheric conditions and varying humidity. Practically all metal parts except die castings are plated unless covered with insulation, dipped and baked.

Material plated consists of aluminum, brass, cast iron and steel parts. Equipment is provided for applying protective plated coatings in copper, tin, nickel and cadmium. In addition, parts to be finished with a baked paint coating are Parkarized before painting.

Practically all plating is in vats although barrels are used on small parts. Parts plated are relatively small in quantities and dimensions. Therefore, entire plating department is arranged to handling varying sizes and quantities of work rather than built up for continuous operation on a single part. This varying production is better handled in a number of smaller plating units than in a single large vat.

Small parts are barrel or tray plated. All others are strung on wires or hung on wire racks. As parts are comparatively small, these loaded racks are easily hand lifted from tank to tank.

Dry floors and relative cleanliness of the entire department are noticeable. Vats for cleaning, rinsing and plating are in line with drip boards between so water or acid does not drain off on the floor as the work is lifted from one vat to the next. Practically the only time water gets on the floor is when a tank leaks.

Positive control over plating operations at all plating vats is handled through installation of ampere-hour totalizing meters, a Sangamo product. Amperage and time required to provide the required deposit of metal has been carefully computed for each part. Whenever a vat is filled, the meter is set to shut off automatically after supplying the predetermined ampere-hours plating.

This procedure prevents underplating and unnecessary overplating.

This ampere-hour meter is a combination clock and ampere totalizing meter with an automatic shut-off developed in the plant for use in the plating department. The meter is similar to the regular Sangamo metering line and has been added as a standard item of manufacturer.

Steel parts exposed to weather or subjected to arcing, as flasher points, are cadmium plated. These parts are first degreased in a vapor cleaner, and rinsed in hot water. Work is then dipped in hot cleaner to remove any deposit or dirt not taken off by the vapor cleaner, rinsed in cold water and then given a cyanide dip, followed by a cold rinse.

Parts to be cadmium plated then are dipped in a combination hot electric cleaner and plater which applies a flash copper coat. Work now is ready for cadmium plating which is handled in a still tub with parts hand racked and emptied. Cadmium coating 10 square feet of steel surface to approximately 0.0004-inch thick requires about 50 ampere hours.

Brass Parts Plated in Rotary Tubs

Steel, copper and brass parts to be nickel plated receive the same cleaning and preparations as for cadmium plating. A nickel protective coating is applied to the greatest quantity and variety of parts. Therefore, rotary tubs are provided for nickel plating brass parts, still tubs for general still work and a horizontal barrel plater for small parts.

Brass parts totaling about 16 square feet surface area receive an 0.0005-inch coating of nickel in 150 ampere hours. Steel parts are given 250 ampere hours for 0.0005-inch deposit on 25 square feet of surface. Copper flash is first applied to all brass cases on switchboard motors. The nickel plating is buffed and polished.

Steel to be nickel plated receives the same cleaning as for brass except that it is given a copper flash. Copper plating also is in vats. Copper coating, 0.00025-inch thick, requires about 25 ampere hours to cover 10 square feet. Figures are based on 92 per cent efficiency of solution for the above material.

For tin plating on steel, parts first are vapor degreased and rinsed. Large parts are hand wiped. Flat work is washed, dried and strung up for cleaning and plating. Large flat work is hand washed, dried and ball burnished before stringing up for plating. Small flat work is strung up with a small washer separator. Other small parts are tin coated in a barrel plater. About 10 square feet of steel surface will receive an 0.0005-inch coating of tin in 85 ampere-hours. These figures are based on 55 per cent efficiency of plating solution.

Small brass screws which cannot be held and are handled in too small quantities to place in the barrel plater are cleaned and plated in small screen trays.

Much of the plated work is placed in individual cardboard boxes or compartment trays for handling to stores or assembly to prevent scratching and protect the finish.

•

Completes Huge Cranes For Grand Coulee Dam

■ Whiting Corp., Harvey, Ill., recently completed for the Grand Coulee dam two overhead traveling cranes each having total lifting capacity of 350 tons each. The cranes are identical in design and size. They consist of a traveling bridge covering a span of 72 feet 8 inches on which are mounted two trolleys of 175 tons capacity each.

Special lifting beams by which the two cranes can be used jointly to handle the large rotors, weighing up to 625 tons at one lift were also included. To support these heavy loads each of the four trolleys is equipped with 1700 feet of 1⅜-inch diameter steel cable operating over a drum 60 inches in diameter.

The electric wiring on both cranes comprises 30,000 feet of copper wire. The total weight of the two cranes complete was under 600 tons.

Issues Booklet on Enameling Clays

■ "What Have We Learned About Clay Since World War I" is the title of the publication recently issued by Ferro Enamel Corp., 4150 East Fifty-sixth street, Cleveland. The author of the booklet is J. T. Irwin, Ferro research and service engineer, who spent the past ten years in assisting in the development of domestic clays to replace German Vallendar clay.

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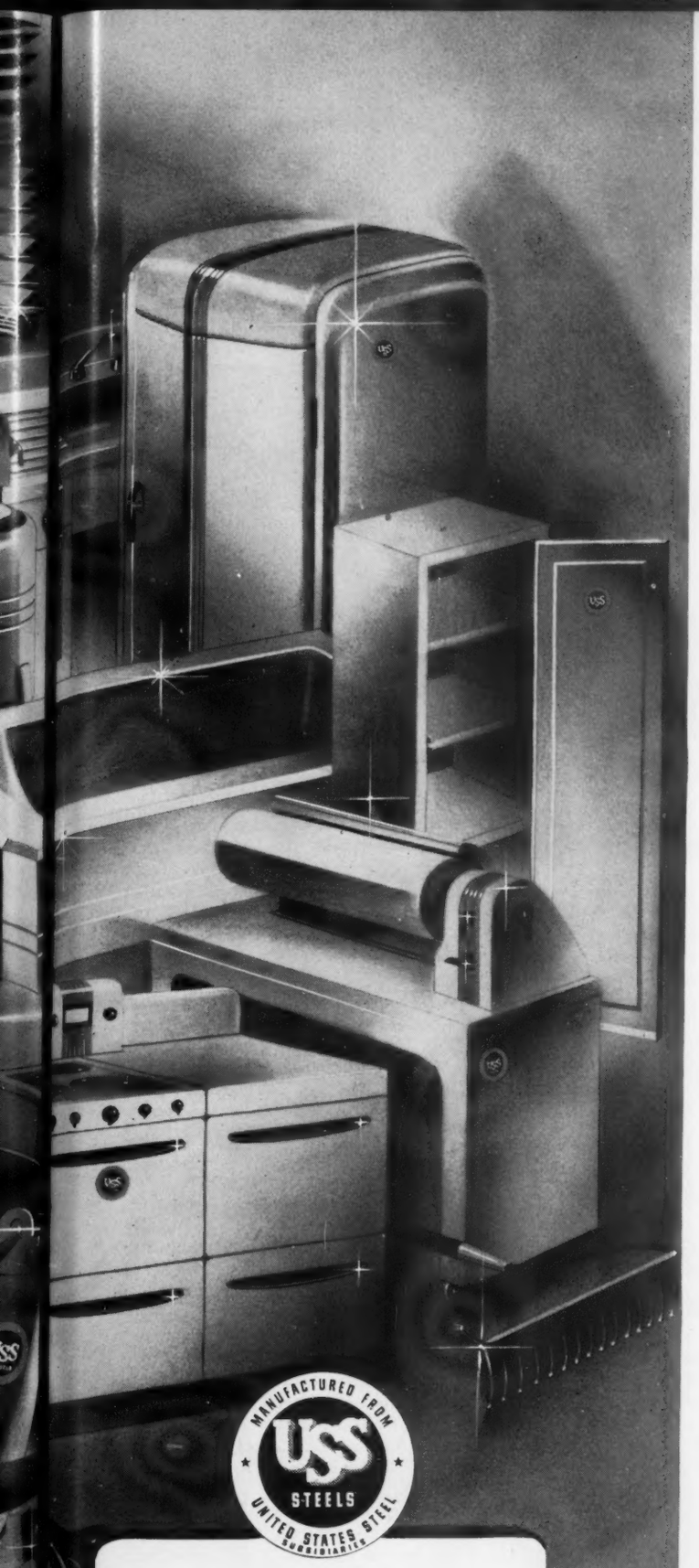

LONG before the average consumer had any thought of the importance to him of trade-marked steel, the U·S·S mark for steel quality had wide acceptance among manufacturers and fabricators. The extension of its use, therefore, in the form of a label on finished steel products offered obvious advantages.

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UNITED STATES STEEL

Welding for Enameling

Sheet metal parts can be welded for the most exacting porcelain enamelware if smooth and properly butted joints are used and if distortion is avoided by correct fixtures of ample heat capacity

■ JOINING sheet steel parts by welding for porcelain enameling as a subsequent operation is neither as complicated as one might believe nor is there any mystery about the process. Application of porcelain enamel in colors and particularly pastel shades requires a surface on the sheet which will not highlight or show any irregularities. This necessarily demands that the welded parts have smooth well-finished contours and surfaces.

Those surfaces which have been hammered or are uneven as a result of excessive drawing operations usually are rejected because of unsatisfactory finish. It is much easier and the cost is lower if the parts to be welded for the final assembly are made by the simplest possible operations, then assembled on fixtures especially designed for welding, and then finished so they can be cleaned properly.

Manufacturing tanks and tubs for household washing machines by the highly developed procedure described here has been found most satisfactory. Compared with conventional stamping and deep drawing methods, including rolling, trimming, etc., it permits lower manufacturing costs, less capital investment and also produces a superior product.

A shop area of approximately 7500 square feet handles manufacture and assembly of 200 tubs per day with ample room for storage of stock as well as placement of squaring shear, blanking and punch press, flattening press, rotary shear, welding fixtures, hammer, grinder, corrugating rolls and final inspection. Another 7500 square feet includes facilities for enameling 200 tubs per day including pickling and cleaning

By **JOSEPH C. LEWIS**
President
Associated Engineers Inc.
Ft. Wayne, Ind.

department, mill department for making the enamel, oven-firing of the finish, drying tunnel and spray booth with sufficient space for inspection and storage of a nominal quantity of finished units.

Thus a plant 100 x 150 feet partitioned into two departments by a light wall can produce 5000 washing machine tubs per month on the basis of an 8-hour day 40-hour week. This corresponds to an output valued at about $15,000. On a 24-hour basis this production easily could be tripled with a substantial cut in manfacturing costs due to lowered overhead and to full-time utilization of heating ovens and other facilities.

Here the tub or tank itself consists of two parts. The vertical sidewall is made by rolling a flat metal sheet into a cylinder with a butt welded longitudinal seam. The flat sheet must be squared properly so when it is rolled into a cylinder and closed by welding, it will have an accurate edge to which the bottom can be welded. This is especially important.

The other part of the tub is struck and formed in a single operation from either strip steel or a circular blank. In this same operation, a radius is turned up around the bottom so that the bottom and sidewall can be butted properly before welding. Any drain holes or other openings in the bottom are punched during this same operation.

Following blanking and piercing, edge of the tub bottom is sheared, using a circular shear which is accurately set to give a true and square edge to facilitate subsequent welding. This produces a bottom part with a turned-up flange or radius, in most cases about ⅜-inch high, ready to be welded to the tub sidewall which has been seamed.

Fig. 1 shows pieces in various stages of completion. At extreme left is the sidewall, rolled. Adjoining it is a sidewall with the longitudinal seam welded. Next is a completed tub with the bottom welded in place and at extreme right is the finished product.

In Fig. 2 is shown the setup for welding the longitudinal seam in the sidewall of the tub. This includes a fixture with heavy clamping plates at either side of the weld as will be seen. These heavy masses of metal conduct heat away rapidly from the sheet adjoining the weld thus keeping distortion to an absolute minimum—an essential for obtaining the smooth contours desired for the finished enameled piece.

The fixture accurately positions the work and holds it in a true circle during welding. The head is progressed automatically along the seam at the desired rate of speed. Blowpipe is equipped with multiple tips of the proper size and number, depending on thickness of the metal as well as speed at which the fixture operates.

Less elaborate equipment is required at nominal outputs than if the plant operates at high speed. This feature permits capital investment to be kept consistent with production, at the same time it eliminates expensive drawing

From paper presented at fortieth annual convention of International Acetylene association, Milwaukee.

ADVERTISING PAGES REMOVED

and forming equipment. Welding is done as the head travels away from the operator, a positioning wheel maintaining the torch at proper distance above the work. The operator merely regulates the flow of gas through the torch. Actual seam is visible to the operator all the time it is being formed.

Most common depth of tub here is 14 inches, for which the actual welding time is 22 seconds. Including the welding and placing of the cylinder in the fixture and its removal after welding, total time is approximately 1 minute. To decrease time required for welding and handling, a water-cooled jig with an automatic clamping device was developed. It operates as a turret head, using welding apparatus which will produce 120 complete cylinders per hour with one welder and one helper.

In welding sidewalls of cylinders, no welding rod is employed.

Cylinder Held by Clamping Ring

Next step is to place the completed cylinder on a special welding fixture and snap the formed bottom piece in the fixture for positioning against the cylinder. The fixture is constructed to flare out the radius flange on the bottom piece. The cylinder is held in place by a quick-acting clamping ring which allows the bottom stamping to abutt squarely against the end in such a manner as to secure a pressure contact entirely around the edge of the tub where it touches the bottom.

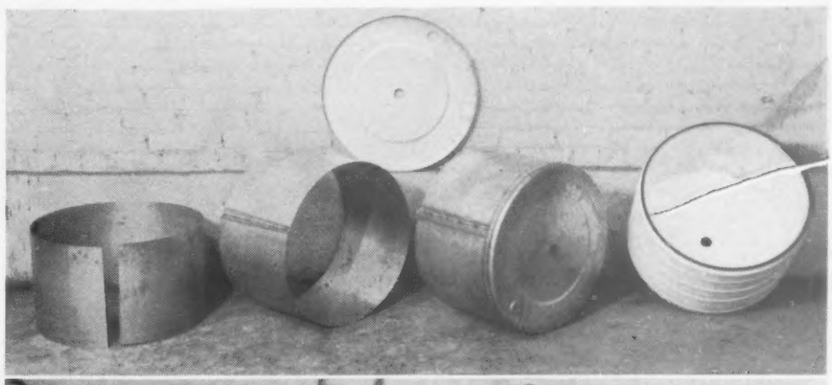
Proper clamping and welding fixtures are of extreme importance. They must be of sufficient weight not only to hold the work rigidly but to carry away rapidly all heat developed. Also the fixtures must be designed to permit easy control of the speed of welding and careful regulation of gas to the blowpipe. As the fixture remains cool during welding merely through the absorption and dissipation of heat through the fixture and its mountings, it is necessary to provide water cooling if the production rate is high. Water-cooled blowpipes also are necessary for high-production work.

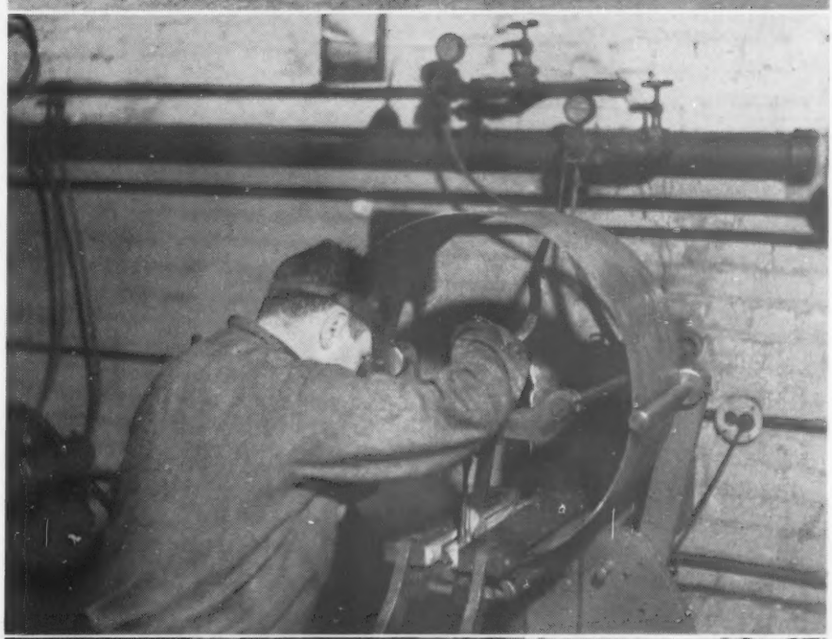
Water-cooled air-operated fixtures have been designed to produce 23-inch tubs involving 78 inches of weld using a 6-tip water-cooled blowpipe traveling at a speed of 42 inches per minute to make a complete weld in slightly less than 2 minutes. Approximately 1 minute is required to load and unload the fixture, although this time can be reduced greatly by applying an air-operated loading device. Normal production from a manually operated fixture is about 20 units per hour, which can be increased to approximately 30 or 35 assemblies per hour with an air-actuated fixture.

Fig. 3 shows a typical hand-operated fixture for making the circumferential welds. It will be noted the equipment involved is inexpensive.

The cylinder blanks can be purchased to size or can be squared on a standard squaring shear, while the bottom blank can be made on a single-acting double-crank punch press with use of either a spring sub-press or pressure pad to draw up the flanges. Cost of such a press

(*Please turn to Page* 79)





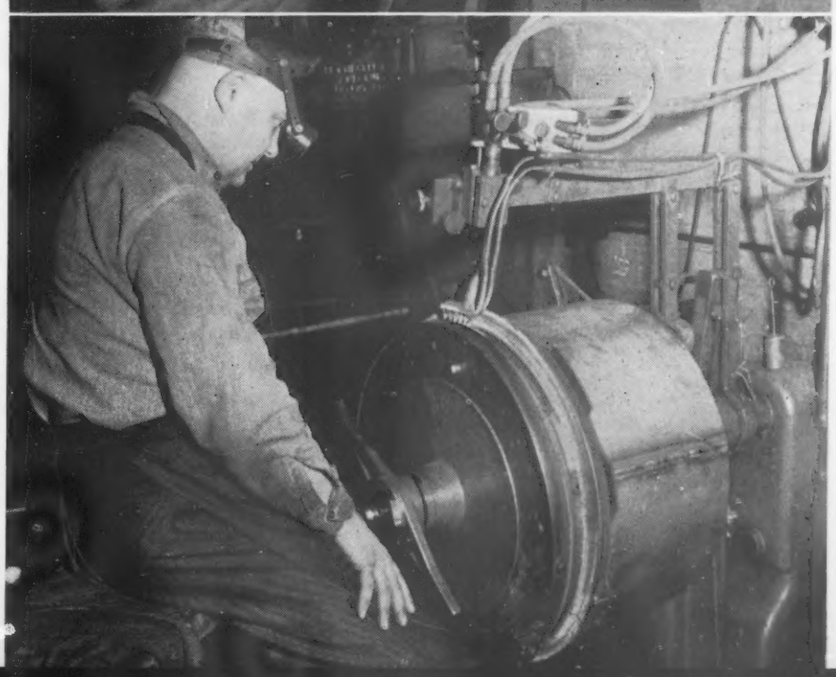


Fig. 1. (Top)—Tub parts in various stages of completion. Fig. 2. (Center)—Equipment used to weld automatically the longitudinal seam in the sidewall sections. Operator merely adjusts torch flames. Fig. 3. (Bottom)—Heavy fixture turns work under multiple tip torch to make circular seam without assistance from operator who watches seam to be sure torch is adjusted and working properly

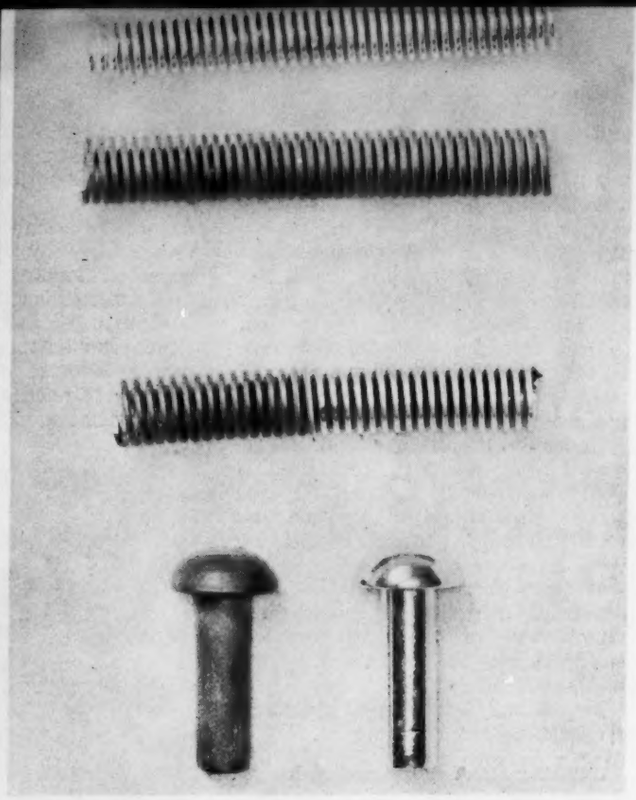


Fig. 1. (Left)—A typical tank installation for electro-polishing stainless. Tank has heating and cooling elements for temperature control, employs copper racks to hold work. Courtesy Phillip Sievering Inc., 199 Lafayette street, New York. Fig. 2. (Right)—Two 18-8 stainless springs at top show appearance before and after electro-polishing. One half of the spring in the center has been treated. Bottom shows 18-8 rivets before and after treatment

Electro-Polishing Stainless

Usefulness of stainless steel in all analyses and mechanical forms, including castings, is greatly enhanced by the recent development of improved electro-polishing to give high luster

By SAM TOUR
Vice President
Lucius Pitkin Inc.
47 Fulton Street
New York

■ STAINLESS steel has become one of the most useful of the alloy steels. It has penetrated both the utility and ornamental metal products fields. In some measure, however, this penetration has been limited by the high cost of finishing and the lack of a method to produce a truly lustrous and enhancing finish on the material. The finishes available for stainless have been mostly matte varieties and some degrees of color buffing, but no degree of buffing has been able to do for stainless what it has done for gold, silver, nickel or chromium. Buffing has not yet been able to remove the fog from its luster finish.

In recent years, Lucius Pitkin, Inc. has been introducing to industry the Blaut-Lang method for electropolishing stainless steel. With the development of electropolishing processes, the way has been paved for great economies in finishing and for the production of a truly beautiful luster on stainless steel.

The finished surfaces obtained by these methods are quite different than those with which we have been familiar. No trace of the common leady or foggy finish appears. Rather, it shows up as a highly lustrous silvery metal which personifies stainless in all the richness it really possesses.

The method is somewhat radical—the orthodox tools of polishing such as cutting, buffing and coloring wheels, along with burnishing and tumbling equipment are simply put aside. The many usual polishing operations are reduced to but a single treatment. In most cases, familiar polishing operations can be entirely omitted.

All this is accomplished by treating the stainless steel at a high current density in a suitable electrolyte. In the early period of development, a bath of sulphuric and hydrofluoric acids mixed with a suitable quantity of water was considered a good electrolyte. However, the hydrofluoric acid proved a rather obnoxious component to some. Consequently, the electrolyte has been revised so it is free of hydrofluoric acid and it has been improved so the finish obtained is superior to that which the original electrolyte made possible.

The base of the present electrolyte is sulphuric and phosphoric acids which are comparatively cheap and are readily available in the commercial market.

The techniques used differ little

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from those used in ordinary plating.

Part of a typical tank installation is shown in Fig. 1. The tanks are lead or glass-lined and provided with heating and cooling elements. The cathodes are of lead or copper. The racks to hold the work, which is the anode in this process, are generally made of copper. The generator capacity required is dependent on the square feet of material to be treated. Currents are higher than those required for ordinary plating operations, approaching more closely the values used in chromium plating. The time required for treatment varies with the condition of the surface and the shape of the object. Typical times for reasonably flat objects are 2 to 4 minutes; for curved objects such as spoons and bowls, 6 to 12 minutes. Potential is from 6 to 12 volts.

Plating barrels to treat such objects as screws, nuts, bolts and items which do not lend themselves to racking with economy are being developed. One type is an inclined rotating barrel submerged in the electrolyte. The work in the barrel is made the anode and cathodes surround the outside of the barrel which has a perforated shell. Another type of barrel is one which lies in a horizontal position and has both inside and outside cathodes.

This particular barrel, however, offers considerable promise for continous processing operations.

Suitable for Many Products

Electropolishing applications have been quite wide. Though the greatest success has been obtained with the 18-8 variety of stainless steel, it has been by no means limited to this one group. Some of the objects which have been treated with success and proved their adaptability are 18-8 wire, band, sheet, pressed and spun shapes, and castings; 14 per cent chromium hardened and tempered springs; 12 per cent chromium spot welded sheets; 17 per cent chromium nuts, bolts, screws, rivets, nails and surgical instruments; 24-12 cast pipe fittings; etc.

Fig. 2 is a view of 18-8 stainless springs and rivets. The two springs at the top show appearance before and after treatment. One-half of the spring in the center has been treated. At the bottom are 18-8 rivets before and after treatment.

One of the greatest advantages has been the readiness and thoroughness with which apparently inaccessible recesses are penetrated.

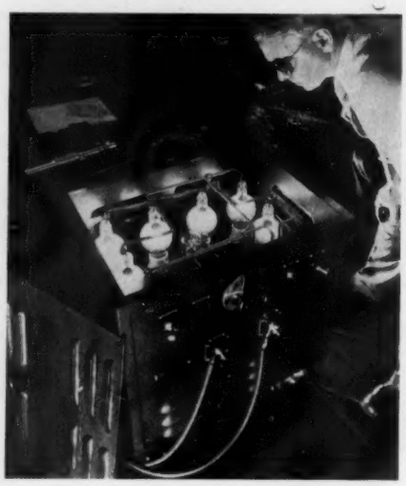
As a result of this process, the consumers market is now being presented with stainless steel cutlery which rivals silver in color and beauty, pans and bowls as highly polished inside as on the outside, trinkets and novelties whose presentation is based on the true lustrous color of stainless steel, and a great variety of other appliances which formerly were difficult to offer the consumer because of the lack of an economical tool for finishing the stainless steels properly.

What the future holds for stainless is difficult to predict, but here is a tool with which to widen the ever-increasing fields for stainless steel.

♦

Electronic Welder Used For Intricate Parts

■ Because there appeared to be no suitable equipment for arc welding thin sheets and other intricate work such as turbine blades, Allis Chalmers Mfg. Co., 1126 South Seventieth street, Milwaukee, developed a low-current mercury-arc rectifier welder capable of welding with currents as low as 5 amperes using



Six of the newest hot-cathode type mercury-arc rectifier tubes are employed in the welder shown above. Tubes are mounted on shockproof carriage safe from damage through ordinary handling methods

new 1/32 and 3/64-inch electrodes especially developed for this machine.

These units have constant characteristics which makes the arc easy to start and gives better control for skip welding as an arc at least 3/8-inch long can be carried. Electrodes thus can be lifted from the metal, moved over and lowered without losing the arc, saving time previously lost in periodically starting up the arc. Range of units is continuously variable from 5 to 75 amperes.

Voltage is adjusted automatically as current is set.

These units are especially adapted to welding stainless steel, monel, nickel and other alloys down to sheets 0.010-inch thick. This equipment is expected to extend the field of arc welding to many jobs where brazing, soldering or gas welding was formerly required.

Six of the newest hot-cathode type mercury-arc rectifier tubes are employed in each unit. A service guarantee of 2000 hours or 1 year from date of sale accompanies each welder.

Tubes are mounted on shockproof carriage and are safe from damage through ordinary handling. The welder can be operated for a considerable time with the electrodes short circuited without harm to the equipment.

The balanced 3-phase load of the rectifier permits it to be connected to any 220-volt 3-phase alternating-current outlet as only 15 amperes are required per phase. With no special wiring necessary and weighing only 250 pounds, the units can be moved about easily.

Solution Copper-Coats Steel by Dipping

■ A coating solution developed by American Chemical Paint Co., Ambler, Pa., makes it possible to coat steel with copper in about 2 minutes without the use of current.

The solution consists normally of 3 per cent of 60 or 66-degree Baume sulphuric acid by volume of water, to which three ounces of Cuprodine have been added for each gallon of solution. The latter, however, is added to the acid and water mixture after it has reached a temperature of 150 degrees Fahr.

Process of coating the steel is simple, consisting of first cleaning the surface to be coated and dipping it in the bath. Cuprodine is used on wire and strip, for masking surfaces before carburizing, and as a foundation for rubber.

Protects Skin Against Chemical Irritations

■ Milburn Co., 905 Henry street, Detroit, announces that Ply, a product used for industrial skin protection, is now manufactured in a series of creams and ointments. Application of the product is based on the principle of supplying the skin with an extra protective coating.

Ply No. 1 and 2 are applied similar to vanishing cream while No. 6 is of the ointment variety. No. 1 is used for protection against dirty grease oil, paint in all forms, asphalt, tar, printing ink and waxes. No. 2 provides protection against the effect of petroleum products, cooling lubricants and cutting compounds and No. 6 is used for protection against acids.

Heating of Steel

(*Concluded from Page* 61)

will appear. The character of overfilling at the roll collar is suggested graphically in Fig. 10.

The hair-line seams occur at areas at the slight long radius under the peak of the extruded metal on the ingot face and also at the area in the sharp corner immediately above it. Of course as the extent of the fill increases a lapping of the metal will take place.

Fig. 11 shows a surface area of a chip taken from a slab possessing hair-line seams. These were not readily visible to ordinary inspection; they were greatly exaggerated by expanding in chipping and indicate what the final result would be. Fig. 12 indicates what may occur in the corner. Fig. 13 is the microstructure of the chip while that shown in Fig. 14 is representative of the grain structure found in the slab adjacent to the area under the chip.

A few examples of the ultimate results on hot and cold strip products will demonstrate the seriousness of hot working steel at too low a temperature.

Fig 17 shows the surface of two samples of hot-rolled strip. The lower sample shows both edge seams and numerous hair-line seams. A large defect runs the length of the samples. A distance in from the edge is a lap. These are due to excessive overfilling during the edging pass. The sample at the top has many edge seams while hair-line seams are in evidence through the surface. Fig. 16, shows excessive edge seams. Fig. 17 is an excellent example of both hair-line seams and strain-lines. The sample was etched slightly. Etching readily attacks planes of weakness due to stress-straining and, therefore, it is indicative of the quality of the material.

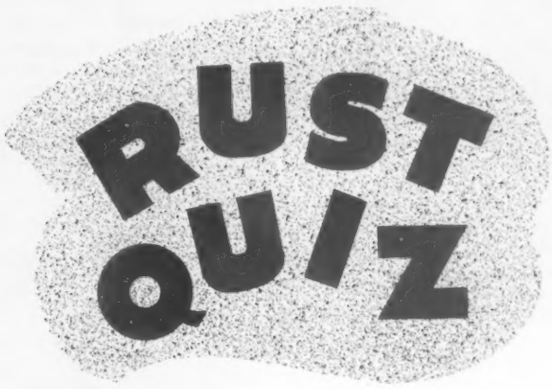
The hair-line seam phase was subjected to a technical investigation by Dipl. Engr. Erich A. Matejka[1].

In many instances the discussion in this article does not fully agree with Matejka's investigation but it is hoped the information on the subject will serve its purpose.

[1] Archiv Fur Das Eisenhuttenwessen, 1929 vol. 2, page 681 to 705; "Hair Cracks on the Surface of Sheets."

Wrench Insert Cast In Hard-Facing Alloys

■ Wrench inserts are now being cast of cobalt-chromium-tungsten alloys in order to give them longer life, according to Haynes Stellite Co., Kokomo, Ind. Inserts of this type are being used regularly by one of the automotive manufacturers in the gripping sockets of pneumatic wrenches for tightening bolts applied on the assembly line.



1. Why does steel Rust?
2. What four things must be present before Rusting can start or continue?
3. Does Rust on steel cause more Rusting?
4. Is Rust active or inert?
5. Does Rust on steel protect the steel from further Rusting?
6. Will Rust action be stopped on steel if ordinary paint is applied over dry Rust?
7. Could any money be saved if the Rust is not removed?
8. Can Rust on steel be used as a pigment for the priming coat?
9. What principal factor is necessary in a primer to prevent or stop Rust Action?

For the answers to these questions write to address below.

THE FLOOD COMPANY
6217 CARNEGIE AVE. CLEVELAND, OHIO

Electronic Pilot Relay

■ Photoswitch Inc., Cambridge, Mass., announces an electronic pilot relay for making possible control of large currents by delicate mechanisms, liquids or extremely light contact pressures normally not capable

of being used to control electrical currents. Control is effected by touching two fine wires or contacts or by their being short-circuited by a liquid or even any moist material.

Electric Glue Pot

■ Westinghouse Electric & Mfg. Co., Mansfield, O., announces two improved oil immersion heaters for heating mineral oil, paraffin and alkaline cleaning solutions. Terminal boxes of these heaters have been changed to condulet boxes thereby simplifying wiring. Noncirculating heater is for tanks or oil baths requiring little or no circulation. Heating tubes range from 14 to 37 inches in length with a rating of 1 to 3 kilowatts. Circulating

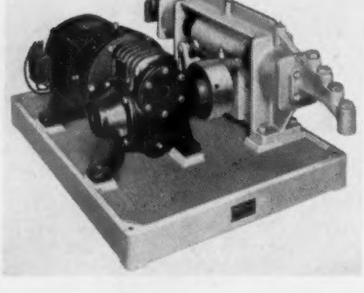
heater is for applications where oil circulates at a sufficient rate to absorb heat and prevent excess heater tube temperatures. Heater tubes range from 32½ to 37 inches in length with a rating of 5 to 8 kilowatts. Both heaters are designed with low watt density per square inch of heating surface.

Speed Reducer

■ Winfield H. Smith Inc., Springville, N. Y., announces a No. 4½B full antifriction bearing equipped worm gear speed reducer. Its high speed shaft is supported in radial-thrust bearings and slow speed shaft in Timken bearings. Its steel worm is an integral part of the shaft. Built-in oil seals are incorporated on both worm gear shafts. The speed reducer has a rating of ¼ to 2 horsepower and weighs 48 pounds.

Chemical Pump

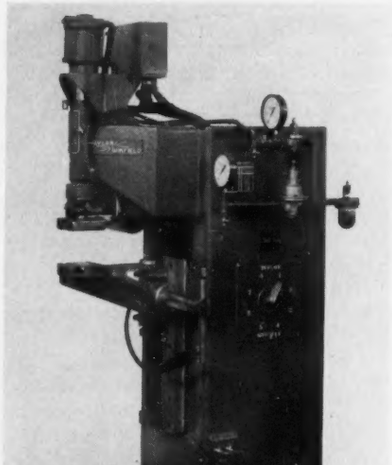
■ Milton Roy Pumps, 3160 Kensington avenue, Philadelphia, has introduced an opposed-type duplex chemi-



cal pump having a capacity of 4 gallons per hour against a pressure of 3000 pounds. Unit is built integral with explosion-proof, geared motor. Feature of the pump is the double-ball, check-valve construction for both suction and discharge on pump chambers. Pump plungers, ball checks and ball seats are all of stainless steel. Pumps can be furnished to pump against pressures up to 20,000 pounds.

Welder Features Swinging Knee and Horn

■ Taylor-Winfield Corp., Warren, O., has developed a Type EN welder provided with a combination swinging knee and horn. The swinging knee when placed in one position provides conventional spot welding points and holders, and when swung in the opposite position permits mounting of projection welding dies. The swinging bracket is clamped in

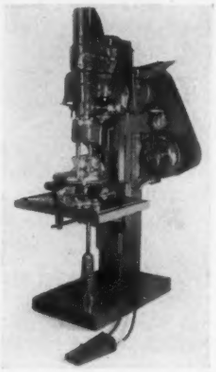


a vertical face plate and is readily adjustable approximately 12 inches to suit various die sets. This adjustment is accomplished by means of a screw arrangement. Swinging arrangement can be furnished in air and motor operated as well as hydraulic machines in all standard capacities and throat depths.

Tapping Machine

■ L. J. Kaufman Mfg. Co., Manitowoc, Wis., has placed on the market a No. 5-A Hi-Duty tapping machine with a No. 40 index and 8-station chucking style dial. It is arranged to hold circular pieces for tapping. The chucking jaws, or complete dial can be changed to accommodate different work of a similar nature. Two pieces are produced at each stroke of the spindle while ejection of finished parts is auto-

matic. The tap spindle will not travel on its downward stroke unless the stations and index pin are in po-



sition. Work dials to accommodate 8, 12 and 16 stations can be furnished, their layout depending upon the material being tapped and the speed at which the taps can be run. Operations are performed with air pressure.

Plugging Switch

■ General Electric Co., Schenectady, N. Y., has introduced a plugging switch for controlling motor stopping in which an Alnico magnet, as its fundamental part, eliminates friction.

During operation, a driven Alnico rotor produces a rotating magnetic field which induces eddy currents in the walls of the aluminum cup.

Magnetic reaction produced by eddy currents turns cup through its limited rotation, and contacts are operated by the Textolite rod which connects cup and movable contact strip.

The centering springs tend to keep contacts in normal position but since magnetic operating force on aluminum cup is dependent on speed, contacts operate at and above a definite speed. As speed decreases, a definite point will be reached where spring force will overcome magnetic force. A different tripping range can be obtained by changing the springs.

Hydraulic Die Lifter

■ West Bend Equipment Co., West Bend, Wis., announces a new portable Weld-Bilt hydraulic die lifter for use in handling heavy dies. It is hand operated and has a full hydraulic raising and lowering unit mounted horizontally beneath the platform, with finger-tip control located at the top of the operating handle.

Platform has a net lift of 4 feet and lowers within 8 inches of the floor.

Standard equipment includes two swivel casters at the handle end, with 7-inch wheels under the platform. Unit has a double-cable lift and can be provided with safety catches.

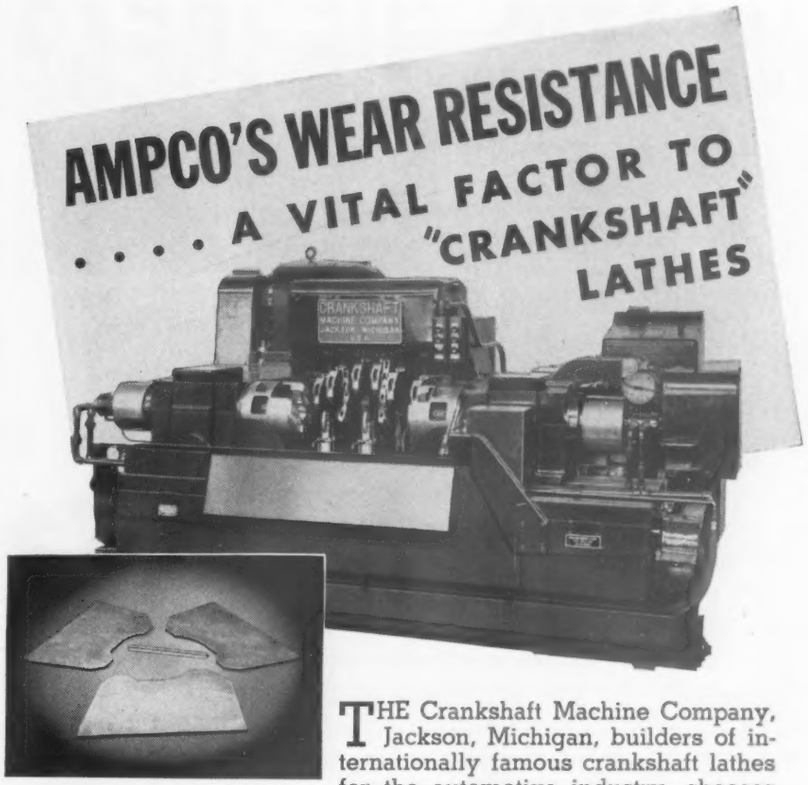
The lifter is available with capacities of 500 to 2500 pounds.

Mercury Relay

■ Durakool Inc., Elkhart, Ind., announces an unbreakable mercury relay which embodies hermetically sealed mercury-to-mercury contacts in a metal shell. It provides near or remote control for many uses. Relay eliminates pitting, burning and corrosion of contacts, provides frictionless operation and requires no maintenance. It is stocked in capacities up to 35 amperes at 115 volts, 60 cycles. It also is available in larger capacities on special order.

Air Nozzles

■ Spraying Systems Co., 4021 West Lake street, Chicago, has developed an air nozzle which sprays with a flat uniform distribution. Nozzles



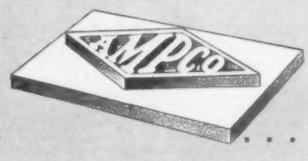
THE Crankshaft Machine Company, Jackson, Michigan, builders of internationally famous crankshaft lathes for the automotive industry, chooses Ampco Metal for parts requiring a high degree of wear resistance and resistance to fatigue and impact—such as side plates for tool arm spacers and for thrust plates on tool arms.

This is another instance of the preference for Ampco Metal for extreme service parts. File 40 of Ampco Engineering Data Sheets will interest you — write for a copy.

AMPCO METAL, INC., Dept. S-617, Milwaukee, Wisconsin

"The Metal without an Equal"

AMPCO METAL



. . . distinguished by this mark.

are available in ¼ and ⅜-inch male or female pipe connection. Capacities range from 2 to 7 cubic feet per minute of free air at 50 pounds pressure. Standard stock construction is brass with monel metal strainer.

Connector

■ Square D Co., 6060 Rivard street, Detroit, announces a new connector which may be used either as a solderless connector or as a solder lug. It has only two parts—a cast lug and a special set screw. The inside of the lug is shaped to obtain maximum holding power on all wire sizes within the limits of the lug.

Improved Strain Clamp

■ Ohio Brass Co., Mansfield, O., announces improvements in its smallest strain clamp which makes it easier to install, increases its holding power and permits accurate conductor alignment. Nose of the clamp has been extended beyond the clamping portion to form a loop which serves as an anchorage for the hook on the block and tackle normally used for sagging line conductors. A reinforcing rib inserted in the middle of the body casting gives added strength.

Two lugs are provided on the main body casting to prevent the head of the bolt from turning when the nut is being tightened. A machine bolt has been substituted for the original carriage bolt to permit greater holding power. Known as the Baby Universal, the clamp accommodates 0.145 to 0.350-inch conductors.

Welding Electrodes

■ Welding Equipment & Supply Co., 2720 East Grand boulevard, Detroit, announces the addition to its line of Eureka tool steel electrodes a new variety known as Drawalloy. These are applicable in the repair of all types of used cast iron or medium hard steel drawing and forming dies and for use on new die construction. They are especially adaptable on sharp drawing or forming contours. Depositions made with Drawalloy are resistant to metal pick up, being austenitic or nonmagnetic. The deposits are medium hard, 240-260 brinell as welded, and work harden in use. Drawalloy also takes a high polish. It is furnished in 1/8, 5/32 and 3/16-inch sizes, 18 inches long and comes packed in 10-pound containers.

Dial Feed Press

■ Federal Press Co., Elkhart, Ind., announces a dial feed press designed to handle with greater speed and accuracy such jobs as high speed marking, mass riveting, pressing, forming, punching and drawing. A special auxiliary safety stop prevents damage to dies in case of a jam. Design of the press permits wide range of tooling and cams assure positive indexing and locking with smooth action. With the automatic loading and ejecting mechanism a production of from 9000 to 10,000 units per hour can be accomplished. The presses are furnished either with or without the automatic loading and ejecting feature.

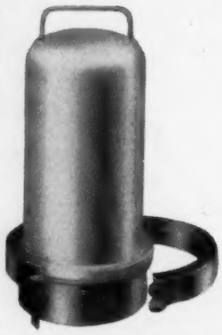
Call Timer

■ Holcomb & Swenarton, 92 Liberty street, New York, has developed a Tele-Trol call timer to eliminate expensive overtime on long distance and teletype calls. It is started by a lever as soon as the party answers the call. The moving indicator shows how much time has been used, and time left at any point during the conversation. A warning bell rings automatically approximately 20 seconds before the 3-minute period elapses.

WHAT'S THE IDEA?

Many improvements fail to materialize—many new products fall short of their profit possibilities because somewhere along the line a special shape or shell is not as practical or as economical as it should be.

Hackney engineering and manufacturing facilities have created many special shapes and shells



New three-part container for dispensing grease

FOR MORE than 35 years Pressed Steel Tank Company engineers have been co-operating with manufacturers in the solution of their problems calling for the development or construction of shapes, shells and containers for gases, liquids and solids.

The cold drawing of seamless containers from metal plates was pioneered by Pressed Steel Tank Co. Where welding is desirable, the superiority of the Hackney methods have been recognized. Because of Hackney's designing and manufacturing facilities the practical solutions to thousands of problems have been obtained at lower cost.

New vertical air receiver with saddle for attaching compressor

Why not let a Hackney engineer help you work out your idea?—there is no obligation and valuable time and cost savings may be effected.

PRESSED STEEL TANK COMPANY

208 S. LaSalle St., Room 1511 Chicago
1387 Vanderbilt Concourse, N. Y.
688 Roosevelt Bldg., Los Angeles
1461 So. 66th St., Milwaukee

Hackney MILWAUKEE **DEEP DRAWN SHAPES AND SHELLS**

Welding for Enameling

(*Concluded from Page* 71)

is only a fraction of that of a press needed for deep-drawing operations where depths of 15 inches or more may be involved.

Finishing of these tanks or tubs for enameling, of course, depends on type of tub required. The bullet-type tub, for example, has a turned-in flange or roll at the top to give a streamlined appearance. These tubs, when taken from the fixture after welding, sometimes require reinforcing the weld at the point where the horizontal seam crosses the vertical weld as there is a tendency for small holes to be burned here. After producing many thousands of tubs, it has been found necessary to "spot" only about 20 percent of the production. To prevent a tear from developing during the rolling operation, which is quite severe, it also is necessary to reenforce the weld at the top edge of the tub where the seam weld starts.

Weld Subjected to Normalizing

After this, the entire weld down the side of the tub and around the bottom is subjected to a quick normalizing or hammer operation using a high-speed vibrating hammer. This does two things: It relieves any strain that may be developed at the weld and also it removes any oxidized metal.

Next operation is to place the welded tub in a grinding fixture which makes a sweep around the longitudinal and circular walls, removing any rough spots or excess metal. Tub now is ready for rolling and corrugating operations.

Several factors have been found important in preparing such work for enameling. If controlled carefully, they will reduce the cost of enameling. First, only high quality steel or iron sheets of uniform specifications and analysis should be employed. Second, use of a lubricant detrimental to the cleaning process should be prohibited. Third, the fabrication schedule should be planned carefully so completed units move at once to the enameling department to avoid damage to tubs through storing or rehandling operations.

First operation in corrugating is to place the tub in a fixture with a roll which revolves at a speed of about 30 revolutions per minute to form the edges of the tub into a rounded rim of about ½-inch diameter. Transferred to a corrugating machine, top of tub is turned in or out as the case may be, and additional corrugations are formed according to the design of the tub.

Total cost of direct labor involved in producing the tub, including blanking the bottom, squaring the sides, shearing the bottom blank, welding the tub, necessary spotting, hammering, grinding, and corrugating operations amounts to 19 cents. This is based on an average of 85 cents per hour rate for the various operators.

Tub now is ready for enameling. By using heavy fixtures, distortion has been avoided and there are no deeply embedded foreign substances from drawing compounds. Cleaning the tub in preparation for enameling thus is comparatively easy. Entire series of operations can follow in rapid succession. Manufacturing costs are much lower than if entirely stamped or drawn parts were used.

Evidence of the ease of enameling, on a job which required nine different tubs made with various corrugations and enameled finishes consisting of a total of 13,779 tubs, only 8.3 per cent had to be reoperated, and only 36 or a negligible percentage had to be scrapped. Of the total, 12,605 came through without having to be reoperated or touched up in any manner. Of these, 574 were mottled finish, 4970 were white and the balance were green and gray.

YOUR POSITIONED WELDING WILL GO EVEN FASTER

with Murex

TYPE FHP

THE HIGH SPEED ELECTRODE FOR DOWNHAND FILLETS, DEEP GROVE WELDING AND COVER BEADS

Easy to use at high amperages, with either A.C. or D.C. current, this recently developed electrode assures more rapid, more economical welding. Its slag is readily controlled and removes freely so that cleaning time is cut to a minimum and costs are reduced appreciably on heavy work where multi-layer welding is required. At the same time, little spatter is produced, weld surfaces are exceptionally smooth, and neat and good-looking concave fillets and cover beads are the result.

Write for full particulars and ask to have a Murex engineer call and show you what Type FHP can do on your production welding.

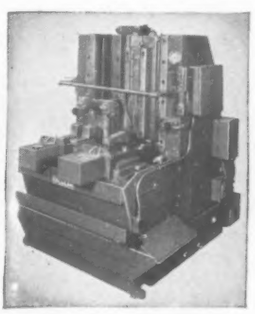
METAL & THERMIT CORPORATION, 120 Broadway, New York, N. Y.

Albany • Chicago • Pittsburgh • So. San Francisco • Toronto

"Murex Electrodes—Thermit Welding—Thermit Metals & Alloys."

Type FHP welds stand the gaff in these stripping tongs made by Shaw-Box Crane & Hoist Co.

Welders qualify readily with Type FHP for code welded work like this butane tank, made by Southwest Factory, Oklahoma City.



Oilgear Company, Milwaukee, builds well-designed, machines; wants clean, neat welds like Type FHP assures.

MUREX HEAVY COATED *Electrodes*

A COMPLETE LINE FOR EVERY WELDING APPLICATION

Investigate Thermit Welding, too—in use since 1902 for heavy repair work, crankshafts, etc.

Automatic Sorting

(*Concluded from Page* 52)

the head-selector unit operates at twice the speed of a length selector.

At this point, rivets have been sorted according to diameter, according to type of head and need only to be sorted according to length.

Sorting to length is done in unique machines, one of which is shown in Fig. 2. While the sifter and the head selector are hand-operated machines, the length selector is a motor-driven device, five of these sorters being employed to handle different classes of rivets of various diameters and head types.

For all its human behavior and apparent complexity, the length sorter is really quite simple in operation. As the operator feeds rivets from the hopper at upper center, Fig. 2, they slide down a chute where their shanks drop through a central slot. The chute in turn leads to a point where they ride into teeth cut into the perimeter of the big wheel which carries them around to the various bins.

At this point, a little fixed arm can be adjusted in their path to knock off either round-head or flat-head rivets into the first of the series of small bins arranged around and below the perimeter of the wheel. Those rivets allowed to go through at this point encounter flaring springs below the wheel level, which trip the rivets off the wheel into their proper bins as they pass along the perimeter of the wheel. Long-shank rivets fall first as the deeper springs catch them, allowing the shorter ones to pass through to subsequent bins. Then the next longest rivets encounter springs tripping them off, and the next, and the next until the shortest length of all rides around to the last bin.

Where the 60 pounds a day of rivets formerly were salvaged by hand methods at a cost slightly greater than their actual value, the rivets now are sorted at a cost of only a few cents per pound. This will permit some $12,500 to be saved on this job, compared to the $15,500 total loss formerly experienced.

According to Harry F. Vollmer, Martin's vice president in charge of manufacturing, development of such simplified yet efficient sorting equipment as that described has considerable possibilities in saving tremendous sums in salvage in many industries using rivets of whatever size or materials. "It is simply a matter of scale," he says. "The principle should have a broad application."

No doubt the principles utilized in these ingenious machines could be adopted to advantage to increase efficiency and cut the cost of many other sorting and handling operations.

♦

Electric Transmissions

(*Concluded from Page* 48)

changer in the rotor circuit of a single synchrotie drive will increase or decrease the speed of the receiver relative to that of the transmitter. Such a combination has quite unusual characteristics. The frequency changer consists of a wound-rotor motor of similar size and characteristics to the tie units and provided with suitable gearing and a driving motor so it can be rotated at a low or variable speed.

Receiver Speed Increased

If all the tie units in such a setup have the same number of poles and a frequency changer is rotated at a speed of 1 revolution per minute, the speed of the receiver connected to the frequency changer will be increased or decreased by 1 revolution per minute, depending on the direction in which the frequency changer is driven. Speed of receiver thus is sum of or difference between transmitter and frequency changer. At zero speed the frequency changer has no effect upon the speed of the receiver, but its connection reduces the torque available in the circuit. The frequency changer is in effect an electric differential, and various arrangements of the drive and control of this motor are possible to meet specific conditions. For instance with the transmitter at standstill, the receiver rotates at same speed as the frequency changer. This may be extremely valuable in making machine adjustments, taking up slack, etc.

Upon starting, rotors of tie units may be displaced at too great an angle, so usually single-phase current first is applied to bring the rotors approximately in phase. Then the 3-phase power is applied, automatically if desired.

However, control equipment for the synchrotie is not complicated and frequently is designed and built with the control for the main drive so suitable interlocking is obtained.

Thus the control can be arranged so the stop button of the synchrotie is inoperative when the main drive is running or the tie cannot be disconnected until a definite time after the main drive has stopped, etc.

To Hold General Enamel Conference

■ National bureau of standards, United States department of commerce announces a general conference on porcelain enamel on refrigerators, both domestic and commercial, to be held June 26.

All those interested are invited to be present in the auditorium of the East building, national bureau of standards, 4100 Connecticut avenue, Washington. Written comments or suggestions are welcome if personal attendance is impossible.

It Pays to Use Dependable Wire Rope

When a wire rope fails, the equipment on which it is used is temporarily out of business, production stops, time is lost and labor is wasted... The best recommendation for "HERCULES" (Red-Strand) Wire Rope is its performance record, by which it continues to make and hold friends—year after year... In order to be suitable for all purposes, "HERCULES" is made in a wide range of both Round Strand and Flattened Strand constructions—all of which are available in either the Standard or Preformed type... If you will tell us how you use Wire Rope, we shall be glad to suggest the construction and type we consider best for your conditions.

Made of Acid Open-Hearth Steel Wire

MADE ONLY BY
A. LESCHEN & SONS ROPE CO.
WIRE ROPE MAKERS — ESTABLISHED 1857
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SAN FRANCISCO · · · 520 Fourth Street
PORTLAND · · · 914 N. W. 14th Avenue
SEATTLE · · · 3410 First Avenue South

< < < HELPFUL LITERATURE > > >

(1)—Diesel Locomotives

Plymouth Locomotive Works—20-page illustrated catalog describing "Flexi-motives," direct drive heavy duty diesel locomotives which are available in sizes from 44 to 65 tons in single unit type and from 90 to 130 tons in double-unit articulated type. Gives details of controls, tabulates specifications, and describes diesel engines.

(2)—Insulating Refractories

M. H. Detrick Co.—16-page illustrated bulletin "Thinsulite Thin-Insulated-Light Walls and Arches." Describes and gives details of construction with this insulating refractory for furnace walls and arches. Shows methods of supporting walls and presents results of laboratory tests.

(3)—Drill Rods

Pittsburgh Tool Steel Wire Co.—48-page illustrated catalog No. 4 gives specifications and application data on cold drawn and special steel drill rods furnished in all sizes down to 0.013 inches, in square, flat, and special shapes. Shows applications and presents useful engineering data.

(4)—Belting

Graton & Knight Co.—Illustrated catalog on belting, contains condensed, tabulated information on transmission belting and is so arranged that one may select the proper belt for each type of drive requirement. Information on belt dressings and cements as well as belting installation and maintenance suggestions are included.

(5)—Spun Heads

Lukens Steel Co.—132 page spiral bound manual "Lukens Flanging and Pressing," contains all major items of information essential to the calculation of prices for forming spun heads. Data and prices for special work are included for designers and fabricators of tanks, boilers, pressure vessels and for equipment involving use of heads.

(6)—Flexible Tubing

Pennsylvania Flexible Metallic Tubing Co.—8 page illustrated bulletin No. 90, describing "Penflex Weld" high pressure flexible all-metal tubing. Presents specifications on plain, braided, and protected tubing and details couplings which are available.

(7)—Plates and Heads

Worth Steel Co.—16-page actual-color illustrated catalog "Steel Plates," shows production of steel plates, and flanged and dished boiler and tank heads. Operations in all departments are illustrated and described.

(8)—Electrical Raceway

Republic Steel Corp.—4-page illustrated bulletin No. C-938 contains full description of the new "Inch-Marked" electrical raceway, which is claimed to make electrical installation easier, more accurate and more economical. These "Electrunite Steeltubes" are marked to aid cutting and bending.

(9)—Plating Control

Sangamo Electric Co.—8-page illustrated bulletin No. 95 describes modern electroplating control with Sangamo amperehour meters. Presents details of meters and shows their application for accurate control. Lists meters available for this purpose.

(10)—Steam Turbines

Westinghouse Electric & Manufacturing Co.—12-page illustrated bulletin No. B.2084-A, presents application, features, design and advantages of type C steam turbines for mechanical drive purposes. Units have capacities from 5 to 500 horsepower at speeds from 1000 to 5000 revolutions per minute.

(11)—Optical Pyrometer

Leeds & Northrup Co.—16-page illustrated catalog No. N-33D describes the new optical pyrometer in models with ranges from 1400 to 5200 degrees Fahr. or to 2800 degrees Cent. Shows uses of this light weight, accurate unit which measures temperature directly in degrees in laboratory or industry.

(12)—Induction Motors

Reliance Electric & Engineering Co.—4-page illustrated bulletin No. 125 describing "Reliance" fully-enclosed fan-cooled induction motors with squirrel-cage frames for 2 and 3-phase alternating current circuits. Features are illustrated and design is shown with cross-sectional drawing.

(13)—Engine Compressors

Worthington Pump & Machinery Corp.—10-page illustrated bulletin No. L-600-B10 describing "Worthington" angle engine-driven compressors, type LTC in six sizes ranging from 375 to 1000 horsepower for refineries, refrigerating plants, gas or air lift pumping, and general air supply.

(14)—Electric Hoists

Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc.—4-page illustrated bulletin No. 347 describes the "Shaw-Box Load Lifter Jr." electric hoists of the heavy duty, low head type with lifting capacities of 350, 500, 750 and 1000 pounds. Gives features and specifications.

(15)—Threaded Products

Pheoll Manufacturing Co.—110-page illustrated 1940 catalog entitled "Screws, Nuts, Bolts." Illustrates and lists standard and special screws and bolts, including "Pheoll-Phillips" recessed head screws and bolts, and time saving lock-washer screws. Presents specifications of all products and list prices.

(16)—Portable Tools

Skilsaw, Inc. — 50-page illustrated catalog No. 41. Gives description, specifications and consumer prices on "Skilsaw" portable electric tools and accessories for construction, maintenance and production. Included are hand saws; drills; belt, disc and floor sanders; hand and bench grinders; and blowers.

(17)—Strain Gages

Baldwin Southwark Div., Baldwin Locomotive Works—16-page illustrated bulletin No. 153, presents complete data on scratch recording strain gages; spring and impulse motor driven, straight and circular target types, extensiometers; bonded metalectic strain gages, tensometers, and telemeters. Describes equipment for physical and dynamic testing and measuring.

(18)—Electric Welder

Harnischfeger Corp.—4-page illustrated bulletin No. W-28 describing the "P & H-Hansen" type WD-150-H205W square frame welder with portable or stationary mounting and range from 200 down to 15 amperes for electric welding service.

(19)—Safety Equipment

Boyer-Campbell Co.—136-page illustrated catalog No. 40 describes safety equipment for man and machine. Gives data on eye, face and head protection, machine tool guards, safety tongs, vacuum lifters, ejectors, clothing, and gloves.

(20)—Tubular Alloy Steels

Babcock & Wilcox Tube Co. — Technical data card No. 6 presents "fingertip," briefly summarized data relating to application of "B & W Croloys" and other tubular material for high temperature service.

(21)—Tools and Dies

Carboloy Co.—12-page illustrated bulletin "Machining 1500 Small Lot Jobs with Carboloy Tools" describes how Warner & Swasey Co. of Cleveland, applied Carboloy general purpose tools throughout their plant. Feeds, speed and typical cross sections of work are given. Blue prints of eight standard tools which were used on most work are included.

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HELPFUL LITERATURE

(Continued)

(22)—Flexible Couplings

Lord Manufacturing Co.—4-page illustrated bulletin No. 200 gives features of "Bonded Rubber" fractional horsepower couplings which absorb vibration, accommodate parallel and angular misalignment, reduce noise and are easy to install. Complete description and specifications are included.

(23)—Safety Clothing

Industrial Gloves Co.—18-page illustrated catalog "Safety Clothing for Industry" features approved industrial safeguards from a line of 3800 items. Latest developments in gloves, mitts, finger guards, arm protectors, aprons, leggings and welder's protective equipment are shown.

(24)—Fans and Blowers

Trufio Fan Co.—12-page loose-leaf catalog entitled "Trufio Fans and Blowers." Presents data and applications of man cooling, crane cab, kiln cooling, wall, exhaust, pent house, and roof ventilating fans and blowers for industrial, commercial and institutional needs.

(25)—Power Factor

General Electric Co.—16-page illustrated bulletin No. GEA-3225 explains power factor and how it can be improved through use of capacitors. Gives examples of savings to be effected and works out sample problems. Useful tables and charts for solving problems are included.

(26)—Flame Cleaning

Air Reduction—8-page illustrated booklet entitled "Flame Cleaning and Dehydrating Structural Steel the Airco Way." Includes reprint of article "Maintenance Painting on the Golden Gate Bridge," and text of paper on "The Cleaning and Painting of Bridge Steel."

(27)—Single Crank Presses

Niagara Machine & Tool Works—26-page illustrated bulletin No. 63-C, gives complete data on "Niagara" series 50 single crank presses. Illustrates and describes features of units and includes engineering specifications for presses in this series.

(28)—Lift Trucks

Automatic Transportation Co.—4-page illustrated bulletin entitled "Borrowed Time" shows skid transportation equipment for all types of materials handling in industry. Illustrates features of low and high-lift trucks in capacities ranging from 3000 to 60,000 pounds.

(29)—Contour Shaping

Continental Machines, Inc.—50-page illustrated "Scrapbook" gives engineering sketches and lists time savings effected through use of "DOALL" contour shaping machines in more than 50 actual operations.

(30)—Lubricant

Acheson Colloids Corp.—4-page technical bulletin No. 130-D gives complete data pertaining to the application of colloidal graphite as a high temperature lubricant. Describes lubrication of oven conveyors, enamelling furnace cars, glass-making machinery, die casting and forging units.

(31)—Speed Reducers

Winfield H. Smith, Inc.—36-page illustrated catalog No. 140, describes and gives applications and specifications of single and double worm gear, spiral gear, spiral and worm gear, spur gear, horizontal, vertical, two-speed, and differential reducers for almost any horsepower requirement.

(32)—Spindle Bearings

Fafnir Bearing Co.—Illustrated book "Super-precision Ball Bearings for Spindles," covers ball bearings and their application to grinding, machining, drilling, polishing and boring equipment. Shows fitting and mounting of bearings and includes data on complete line of "Super-precision" ball bearings.

(33)—Shapers

Cincinnati Shaper Co.—28-page illustrated catalog No. N-1 presents features of power rapid traverse, universal, utility and high speed shapers. Automatic flood lubrication, built-in power rapid traverse to table, selective multiple cam feeds and universal table are discussed in detail.

(34)—Steel Valves

Crane Co.—306-page illustrated catalog No. 40-S is devoted exclusively to steel valves and fittings, and kindred steel specialties and accessories. Contains engineering data pertaining to high pressure-temperature piping problems. Prepared for engineers and industrial executives.

(35)—Forgings

Drop Forging Association—8-page illustrated bulletin entitled "Choose One and Get All Seven," describes applications of forgings to industrial machinery and equipment. Lists as seven features of forgings: — strength, uniformity, weight reduction, welding adaptability, lower machining costs, safety, and endurance.

(36)—Tool Room Machine

Hannifin Manufacturing Co.—6-page illustrated bulletin No. 51 gives specifications and description of the No. 10 tool room machine which combines a precision lathe, a sensitive drill press, a horizontal and a vertical milling machine in one compact unit for all types of standard tool room operations.

(37)—Small Electric Hoist

Detroit Hoist & Machine Co.—4-page illustrated bulletins No. 801 and 725, describe and give features of the new "Titan" electric hoist which is available in capacities of 250, 500, and 750 pounds, with hoisting speeds up to 60 feet per minute. Details of available mountings are included.

(38)—Nickel Alloys

International Nickel Co.—16-page illustrated bulletin No. T-9 gives complete engineering properties of "K" Monel. Included are composition, physical constants, properties, working instructions, heat treatment, corrosion resistance, mill products, and applications.

(39)—Copper-Coating Steel

American Chemical Paint Co.—4-page bulletin No. 13-9 gives characteristics and applications of "Cuprodine" for copper-coating steel without current by simply dipping work in the coating solution. Describes use wherever a tight, bright copper coating is required quickly and economically.

(40)—Turret Lathe Tools

Gisholt Machine Co.—24-page illustrated catalog No. 1066B describes standard tools for turret lathes. Included are the new single multiple cutter turners and a 4-jaw independent chuck, as well as tools adaptable to a wide range of work which tools can be used also on standard makes of turret lathes.

(41)—Diesel Engines

Chicago Pneumatic Tool Co.—16-page illustrated bulletin No. 768, contains complete description and data on type 8 and type 9 diesel engines for continuous heavy-duty stationary service. Large cross-sectional illustration shows operating features. Rating curves are included.

(42)—Tachometers

Bristol Co.—Illustrated bulletin No. 542 describing recording and indicating tachometers for measuring speed of rotation and speed of travel. Contains information on round-chart and strip-chart potentiometer-type tachometers, the latter accommodating as many as eight records on a 12-inch chart.

(43)—Elevating Trucks

Lyon Iron Works—Illustrated circular No. 115, presents uses, available types and specifications of cantilever and toggle types of trucks with hydraulic elevating tables for materials handling services.

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Steelmaking Nearing Practical Capacity

Steady upward movement as domestic, export buying increases. Railroad activity renewed. Naval building requirements taking form

MARKET IN TABLOID ★

Demand
Heavy; export placements increase.

Prices
Strong; ferroalloys advance; scrap higher.

Production
Further rise of 4½ points to 86 per cent.

■ WITH substantial armament tonnage developing, for export and defense, steel operations continue to rise steadily, advancing 4½ points last week to 86 per cent. While there is opportunity for some further increase the rate is approaching practical capacity and expected heavy requirements for the Allies and for domestic defense may result in preferential allocations for essential purposes.

Steelmakers have been pushing deliveries as rapidly as possible, to clear books for armament requirements and avoid congestion. Signs of speeding up defense preparations appear in various directions. Prompt award of 22 naval vessels in the 1941 fiscal year program, 13 to navy yards and nine to private builders, while not offering steel for immediate rolling, provides a heavy continuing demand as work progresses. These ships will require well over 75,000 tons of steel, in addition to tonnage for equipment. York Safe & Lock Co., York, Pa., has been awarded 350 carriages for 37-millimeter antitank guns and bids are pending on 416 more. Orders also have been placed for shells, tank parts and other materials, but the total is not sufficient yet to crowd producers.

Among inquiries for war material for the Allies is one for 34,000 tons of hot and cold-rolled and galvanized sheets. Canadian manufacturers have contracts for 300 tanks for Great Britain, armored with four-inch plates. Such plates are not produced in Canada and must be imported, probably from the United States.

Rising price of manganese ore has caused advance of $20 per ton on ferromanganese, and $4 to $10 on spiegeleisen. Silicon alloy prices have been increased $5 to $10 per ton, according to grade. These prices are effective at once on spot purchases and July 1 on contracts. Third quarter contract prices on vanadium metals and alloys and ferrotitanium have been reaffirmed and indications are that chromium alloy prices will not be changed for that delivery. Closing of the Mediterranean by Italy's war declaration has stopped shipments from Russia and other countries bordering that sea, important ore sources, and the situation is unsettled, no prices being quoted. Exports to the Mediterranean countries are also prevented, the largest item in this trade being 250,000 tons of scrap bought recently by Italy, none of which had been shipped. Important tonnages of steel products have been going to these countries in recent years.

Railroad rolling stock buying last week assumed more activity than for several months, 3260 freight cars and 16 steam locomotives being placed. This is a greater number of cars than any full month since October, 1939. Great Northern led with 1250 cars, followed by Gulf, Mobile & Northern with 1000 and Virginian and Minneapolis, St. Paul & Sault Ste. Marie with 500 each. Western Maryland's order for 12 steam locomotives is the largest for several months.

Seasonal drop in automobile production is unusually slow. Last week's output is estimated at 93,635 units, only 1925 less than the preceding week. In the comparable week last year production was 78,305 cars.

Indicative of the heavier movement of finished steel is the report of United States Steel Corp. of its shipments in May. Total was 1,084,057 net tons, 19.4 per cent greater than in April, exceeded this year only by January. For five months total shipments were 5,078,714 tons, 26 per cent over the corresponding period last year.

Scrap continues to advance, the steelworks composite last week reaching $19.33, an increase of 66 cents, highest since the end of last November. The same influence caused a gain of 17 cents in the iron and steel composite, which moved up to $37.76.

Only two districts failed to increase output last week, the remaining ten contributing to the 4½-point rise. New England at 66 and Cleveland at 82 per cent made no change. Detroit increased 20 points to 95 per cent, St. Louis 12 points to 68, Wheeling 11 points to 90, Cincinnati 6 points to 76, Buffalo 6 points to 90, Chicago 5½ points to 91.5, Youngstown 3 points to 70, Birmingham 3 points to 88, Eastern Pennsylvania 3 points to 76, and Pittsburgh 1 point to 81 per cent.

COMPOSITE MARKET AVERAGES

	June 15	June 8	June 1	One Month Ago May, 1940	Three Months Ago March, 1940	One Year Ago June, 1939	Five Years Ago June, 1935
Iron and Steel	$37.76	$37.59	$37.55	$37.33	$37.07	$35.69	$32.42
Finished Steel	56.60	56.60	56.60	56.60	56.50	55.70	54.00
Steelworks Scrap..	19.33	18.67	18.38	17.18	16.47	14.49	10.45

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	June 15, 1940	May 1940	Mar. 1940	June 1939
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Iron bars, Chicago	2.25	2.25	2.25	2.05
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.00
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.00
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.45

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	1.92

Pig Iron

	June 15, 1940	May 1940	Mar. 1940	June 1939
Bessemer, del. Pittsburgh	$24.34	$24.34	$24.34	$22.34
Basic, Valley	22.50	22.50	22.50	20.50
Basic, eastern, del. Philadelphia	24.34	24.34	24.34	22.34
No. 2 foundry, Pittsburgh	24.21	24.21	24.21	22.21
No. 2 foundry, Chicago	23.00	23.00	23.00	21.00
Southern No. 2, Birmingham	19.38	19.38	19.38	17.38
Southern No. 2, del. Cincinnati	22.89	22.89	22.89	20.89
No. 2X, del. Phila. (differ av.)	25.215	25.215	25.215	23.215
Malleable, Valley	23.00	23.00	23.00	21.00
Malleable, Chicago	23.00	23.00	23.00	21.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	28.34
Gray forge, del. Pittsburgh	23.17	23.17	23.17	21.17
Ferromanganese, del. Pittsburgh	125.33	105.33	105.33	85.33

Scrap

Heavy melt. steel, Pitts.	$20.25	$18.00	$17.05	$15.00
Heavy melt. steel No. 2, E. Pa.	18.25	16.00	15.90	13.10
Heavy melting steel, Chicago	18.25	16.65	15.50	13.40
Rails for rolling, Chicago	22.25	20.45	18.25	17.65
Railroad steel specialties, Chicago	21.75	19.75	18.40	15.30

Coke

Connellsville, furnace, ovens	$4.75	$4.75	$4.75	$3.75
Connellsville, foundry, ovens	5.75	5.75	5.75	5.00
Chicago, by-product fdry., del.	11.25	11.25	11.25	10.50

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast ports	2.65c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast ports	3.70c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast ports	4.05c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.55c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.40c	4.00c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	24.00	35.00
Cold stp.	22.00	22.50	32.00	52.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.46c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	4.00c

Structural Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast ports	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.05c
Chicago or Gary	2.05c
Detroit, delivered	2.15c
Cleveland	2.05c

Buffalo	2.05c
Birmingham	2.05c
Gulf ports	2.40c
Pacific Coast ports	2.70c

Iron

Chicago	2.25c
Philadelphia, del.	2.37c
Pittsburgh, refined	3.50-8.00c
Terre Haute, Ind.	2.15c

Reinforcing

New Billet Bars, Base

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	1.60-1.90c
Gulf ports	1.95-2.25c
Pacific Coast ports	2.00-2.30c

Rail Steel Bars, Base

Pittsburgh, Gary Chicago, Buffalo, Cleveland, Birm.	1.60-1.90c
Gulf ports	1.95-2.25c
Pacific Coast ports	2.00-2.30c

The above represent average going prices. Last quotations announced by producers were 2.15c, mill base, for billet bars and 2.09c for rail steel.

Wire Products

Pitts-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails	$2.55

(Per pound)

Polished fence staples	2.55c
Annealed fence wire	3.05c
Galv. fence wire	3.40c
Woven wire fencing (base C. L. column)	67
Single loop bale tie, (base C.L. column)	56
Galv. barbed wire, 80-rod spools, base column	70
Twisted barbless wire, column	70

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg..$3.85

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

* Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.70c

Detroit, delivered 2.80c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.55

4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.10

5100 0.80-1.10 Cr. 0.45

5100 Cr. spring flats 0.15

6100 bars 1.20

6100 spring flats 0.85

Cr. N., Van. 1.50

Carbon Van. 0.85

9200 spring flats 0.15

9200 spring rounds, squares 0.40

Electric furnace up 50 cents.

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast ports	2.75c
Cooperage hoop, Young., Pitts.; Chicago, Birm.	2.20c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve., Pitts.
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts separate 72.5 off; with nuts attached add 15%; bulk 83.5 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less.	67	70
⅝-1-inch	64	65
1⅛-1½-inch	62	62
1⅝ and larger	60	..

Hexagon Cap Screws

Upset, 1-in., smaller	70.0 off

Square Head Set Screws

Upset, 1-in., smaller	75.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.85c
Pacific Coast ports	2.95c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural	3.40c
⅞-inch and under	65-10 off

Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63½	54
¼	66½	58
1—3	68½	60½

Iron

¼	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O.D.	13	$ 9.72	$23.71
1¾" O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼" O.D.	13	13.79	21.68
2¼" O.D.	12	15.16	....
2½" O.D.	12	16.58	26.57
2¾" O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½" O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1 "O.D.	13	$ 7.82	$ 9.01
1¼ "O.D.	13	9.26	10.67
1½ "O.D.	13	10.23	11.79
1¾ "O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼ "O.D.	13	14.54	16.76
2¼ "O.D.	12	16.01	18.45
2½ "O.D.	12	17.54	20.21
2¾ "O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½ "O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½ "O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl. (per 100 lbs.)	$2.00
Do., over ⅝ to 47/64-in. incl.	2.15

Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.50.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.35- 4.60
Connellsville, fdry.	5.00- 5.75
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.25- 6.50
Wise county fdry	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.38-11.85
Chicago, outside del.	10.50
Chicago, delivered	11.25
Terre Haute, del.	10.75
Milwaukee, ovens	11.25
New England, del.	12.50
St. Louis, del.	11.75
Birmingham, ovens	7.50
Indianapolis, del.	10.75
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	11.25
Detroit, del.	11.00
Philadelphia, del.	11.15

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	25.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.)	14.75c
Do. (1000 lbs. or over)	13.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$24.00	$24.50	$23.50	$25.00
Birdsboro, Pa.	24.00	24.50	23.50	25.00
Birmingham, Ala.‡	19.38	.....	18.38	24.00
Buffalo	23.00	23.50	22.00	24.00
Chicago	23.00	23.00	22.50	23.50
Cleveland	23.00	23.00	22.50	23.50
Detroit	23.00	23.00	22.50	23.50
Duluth	23.50	23.50	.....	24.00
Erie, Pa.	23.00	23.50	22.50	24.00
Everett, Mass.	24.00	24.50	23.50	25.00
Granite City, Ill.	23.00	23.00	22.50	23.50
Hamilton, O.	23.00	23.00	22.50	.....
Neville Island, Pa.	23.00	23.00	22.50	23.50
Provo, Utah	21.00	.....	.....	.....
Sharpsville, Pa.	23.00	23.00	22.50	23.50
Sparrow's Point, Md.	24.00	.....	23.50	.....
Swedeland, Pa.	24.00	24.50	23.50	25.00
Toledo, O.	23.00	23.00	22.50	23.50
Youngstown, O.	23.00	23.00	22.50	23.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:

Akron, O., from Cleveland	24.39	24.39	23.89	24.89
Baltimore from Birmingham	24.78	.....	23.66	.....
Boston from Birmingham	24.12	.....	.....	.....
Boston from Everett, Mass.	24.50	25.00	24.00	25.50
Boston from Buffalo	24.50	25.00	24.00	25.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00	.....	.....
Canton, O., from Cleveland	24.39	24.39	23.89	24.89
Chicago from Birmingham	†23.22	.....	.....	.....
Cincinnati from Hamilton, O.	23.24	24.11	23.61	.....
Cincinnati from Birmingham	23.06	.....	22.06	.....
Cleveland from Birmingham	23.32	.....	22.82	.....
Mansfield, O., from Toledo, O.	24.94	24.94	24.44	24.44
Milwaukee from Chicago	24.10	24.10	23.60	24.60
Muskegon, Mich., from Chicago, Toledo or Detroit	26.19	26.19	25.69	26.69
Newark, N. J., from Birmingham	25.15	.....	.....	.....
Newark, N. J., from Bethlehem	25.53	26.03	.....	.....
Philadelphia from Birmingham	24.46	.....	23.96	.....
Philadelphia from Swedeland, Pa.	24.84	25.34	24.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	25.31	25.31	24.81	25.81
St. Louis, northern	23.50	23.50	23.00	.....
St. Louis from Birmingham	†23.12	.....	22.62	.....
St. Paul from Duluth	25.63	25.63	.....	26.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $28.50, base; $29.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$22.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	22.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Domestic dead - burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$50.00
Chem. bonded chrome	50.00
Magnesite brick	72.00
Chem. bonded magnesite	61.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	20.00
Do. barge	20.00
No. 2 lump	21.00

Ferroalloy Prices

Ferromanganese, 78-82%, carlots, duty pd. $120.00
Ton lots 130.00
Less ton lots 133.50
Less 200 lb. lots 138.00
Do., carlots del. Pitts. 125.33
(effective on contracts July 1)

Spiegeleisen, 19-21% dom.
Palmerton, Pa., spot 36.00
Do., 26-28% 49.50
(effective on contracts July 1)

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 82.00
Do., 75 per cent 126.00
Do. ton lots 142.00
Spot, $5 a ton higher.
(contracts on 50 p.c. up $5 and on 75 p.c., $9, effective July 1; spot $5 higher)

Silicomanganese, c.l., 2½ per cent carbon, 103.00
2% carbon, 108.00; 1%, 118.00
Contract ton price $12.50 higher; spot $5 over contract.
(contracts up $15 July 1, with spot $5 higher)

Ferrotungsten, stand., lb. con. del. cars 1.90-2.00

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 11.00c
Do., ton lots 11.75c
Do., less-ton lots 12.00c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	17.50c	18.25c	18.75c
1% carb.	18.50c	19.25c	19.75c
0.10% carb.	20.50c	21.25c	21.75c
0.20% carb.	19.50c	20.25c	20.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. tl., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, tl., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00
15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, freight allowed, lb. spot carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot, ¼c higher.

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 84.00c
Do., spot 89.00c
88% chrome, contract 83.00c
Do., spot 88.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c
Do., 2% 12.50c
Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $69.50
Ton lots 79.50
Less-ton lots, lb. 3.75c
Less 200 lb. lots, lb. 4.00c
Spot ¼-cent higher.

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.00c
Ton lots 5.50c
Less-ton lots 5.75c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton $97.50
Do, spot 102.50
(up $5, effective July 1)

34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: SAE 2300	Cold Drawn Bars: SAE 3100
Boston	3.98	3.86	4.86	3.85	3.85	5.66	3.51	4.48	4.66	3.46	4.13	8.63	7.23
New York Met.)	3.84	3.76	3.76	3.76	3.75	5.56	3.38	4.40	4.05	3.31	4.09	8.59	7.19
Philadelphia	3.85	3.75	4.25	3.55	3.55	5.25	3.35	4.05	4.25	3.31	4.06	8.56	7.16
Baltimore	3.95	4.05	4.45	3.70	3.70	5.25	3.55	....	5.05	....	4.05	....	..
Norfolk, Va.	4.15	4.25	....	3.90	3.90	5.45	3.75	....	5.40	....	4.15	....	....
Buffalo	3.35	3.62	3.62	3.62	3.40	5.25	3.05	4.30	4.45	3.22	3.75	8.15	6.75
Pittsburgh	3.35	3.40	3.40	3.40	3.40	5.00	3.15	....	4.45	....	3.65	8.15	6.75
Cleveland	3.25	3.30	3.30	3.40	3.58	5.18	3.15	4.05	4.42	3.20	3.75	8.15	6.75
Detroit	3.43	3.23	3.48	3.60	3.65	5.27	3.23	4.30	4.64	3.20	3.80	8.45	7.05
Omaha	3.90	3.80	3.80	3.95	3.95	5.55	3.45	....	5.00	....	4.42	....	....
Cincinnati	3.60	3.47	3.47	3.65	3.68	5.28	3.22	4.00	4.67	3.47	4.00	8.50	7.10
Chicago	3.50	3.40	3.40	3.55	3.55	5.15	3.05	4.10	4.60	3.30	3.75	8.15	6.75
Twin Cities	3.75	3.65	3.65	3.80	3.80	5.40	3.30	4.35	4.75	3.83	4.34	8.84	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
St. Louis	3.62	3.52	3.52	3.47	3.47	5.07	3.18	4.12	4.87	3.41	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Indianapolis	3.60	3.55	3.55	3.70	3.70	5.30	3.25	....	4.76	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.68	3.70	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.33	4.33	5.93	3.99	....	5.71	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.88	3.45	....	4.75	..	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	4.05	6.20	6.20	4.05	4.05	5.75	4.20	....	5.25	....	....	....	....
Seattle	4.00	3.85	5.20	3.40	3.50	5.75	3.70	6.50	4.75	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.60	4.45	4.00	4.00	6.40	4.30	6.50	5.25	....	6.60	10.65	9.80
San Francisco	3.50	4.00	6.00	3.35	3.35	5.60	3.40	6.40	5.15	....	6.80	10.65	9.80

	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	....
Philadelphia	4.10	7.31	5.86	5.61	8.56
Baltimore	4.10	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.20	5.75	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.48	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.40	8.55	8.40	9.05
San Francisco	5.00	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston: 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 300-4999 in San Francisco, Portland; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, 1500-3499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle, San Francisco; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 1500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 10 to 24 bundles in Philadelphia.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, June 13

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports	£ s d	Continental North Sea ports gross tons‡‡ Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$22.33	6 0 0	$33.23	3 18 0
Basic bessemer	.....	.....	.....	.....
Hematite, Phos. .03-.05	23.31	6 5 0	.....	.....
Billets	.....	.....	$31.95	3 15 0
Wire rods, No. 5 gage	.....	.....	60.71	7 2 6
Standard rails	$39.17	10 10 0	$48.99	5 15 0
Merchant bars	2.25c	13 9 0	2.77c	7 6 0
Structural shapes	2.02c	12 2 6	2.83c	7 9 0
Plates, †¼ in. or 5 mm.	2.15c	12 17 6	3.53c	9 6 0
Sheets, black, 24 gage or 0.5 mm	2.84c	17 0 0	2.98c	7 17 0°
Sheets, gal., 24 ga., corr.	3.39c	20 6 3	3.94c	10 7 6
Bands and strips	.....	.....	2.76c	7 5 0
Plain wire, base	.....	.....	3.15c	8 6 3
Galvanized wire, base	.....	.....	3.75c	9 17 6
Wire nails, base	.....	.....	3.56c	9 7 6
Tin plate, box 108 lbs.	$ 5.97	1 12 0	.....	.....

British ferromanganese $100.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian §§Francs		Reich §§Mar
Fdy. pig iron, Si. 2.5	$20.70	5 11 0(a)	$17.18	788	$31.44	950	$25.33	63
Basic bess. pig iron	19.49	5 4 6(a)	.....	...	29.79	900	27.94	(b) 69.50
Furnace coke	5.90	1 11 8	4.91	225	10.92	320	7.64	19
Billets	34.97	9 7 6	25.35	1,163	42.20	1,275	38.79	96
Standard rails	1.86c	11 3 0	1.60c	1,602	2.06c	1,375	2.38c	132
Merchant bars	2.34c	14 0 0††	1.45c	1,454	2.06c	1,375	1.98c	110
Structural shapes	2.07c	12 8 0††	1.41c	1,414	2.06c	1,375	1.93c	107
Plates, †¼-in. or 5 mm.	2.09c	12 10 6††	1.85c	1,848	2.42c	1,610	2.29c	127
Sheets, black	2.92c	17 10 0§	2.19c	2,193‡	2.85c	1,900‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.48c	20 16 3	3.59c	3,589	4.80c	3,200	6.66c	370
Plain wire	3.26c	19 10 0	2.34c	2,340	3.00c	2,000	3.11c	173
Bands and strips	2.46c	14 15 0††	1.63c	1,632	2.48c	1,650	2.29c	127

†British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling not quoted. §§Last prices, no current quotations. ‡‡ No quotations.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	16.00
Bos. dock No. 1 exp.	16.25-16.75
New Eng. del. No. 1	14.50-15.00
Buffalo, No. 1	18.50-19.00
Buffalo, No. 2	16.50-17.00
Chicago, No. 1	18.00-18.50
Chicago, auto, no alloy	17.00-17.50
Cincinnati, dealers.	15.50-16.00
Cleveland, No. 1	20.00-20.50
Cleveland, No. 2	19.00-19.50
Detroit No. 1	†16.00-16.50
Detroit No. 2	†15.00-15.50
Eastern Pa., No. 1.	19.50-20.00
Eastern Pa., No. 2.	18.00-18.50
Federal, Ill., No. 2.	15.00-15.50
Granite City, R. R. No. 1	†15.25-15.75
Granite City, No. 2.	15.00-15.50
Los Ang., No. 1, net	13.00-13.50
Los Ang., No. 2, net	12.00-12.50
N. Y. dock No. 1 exp.	16.00
Pitts., No. 1 (R. R.).	21.50-22.00
Pittsburgh, No. 1	20.00-20.50
Pittsburgh, No. 2	18.50-19.00
St. Louis, No. 1	†16.00-16.50
St. Louis, No. 2	†15.00-15.50
San Fran., No. 1, net	13.00-13.50
San Fran., No. 2, net	12.00-12.50
Seattle, No. 1	16.00
Toronto, dirs., No. 1	11.00
Valleys, No. 1	20.25-20.75

COMPRESSED SHEETS

Buffalo, new	17.00-17.50
Chicago, factory	17.50-18.00
Chicago, dealers	15.50-16.00
Cincinnati, dealers.	14.75-15.25
Cleveland	19.50-20.00
Detroit	†17.50-18.00
E. Pa., new mat.	19.50-20.00
E. Pa., old mat.	15.50-16.00
Los Angeles, net	10.00-10.50
Pittsburgh	20.00-20.50
St. Louis	†13.00-13.50
San Francisco, net	10.00-10.50
Valleys	19.50-20.00

BUNDLED SHEETS

Buffalo, No. 1	16.50-17.00
Buffalo, No. 2	15.00-15.50
Cleveland	15.50-16.00
Pittsburgh	18.50-19.00
St. Louis	†11.00-11.50
Toronto, dealers	9.75

SHEET CLIPPINGS, LOOSE

Chicago	13.00-13.50
Cincinnati, dealers.	10.50-11.00
Detroit	†14.00-14.50
St. Louis	†10.50-11.00
Toronto, dealers	9.00

BUSHELING

Birmingham, No. 1.	15.00
Buffalo, No. 1	16.50-17.00
Chicago, No. 1	16.50-17.00
Cincin., No. 1 deal.	11.50-12.00
Cincin., No. 2 deal.	6.00- 6.50
Cleveland, No. 2	12.00-12.50
Detroit No. 1 new.	†16.50-17.00
Valleys, new, No. 1	18.00-18.50
Toronto, dealers	5.50- 6.00

MACHINE TURNINGS (Long)

Birmingham	5.00
Buffalo	11.00-11.50
Chicago	12.00-12.50
Cincinnati, dealers.	7.50- 8.00
Cleveland, no alloy.	11.50-12.00
Detroit	†10.50-11.00
Eastern Pa.	13.50
Los Angeles	4.00- 5.00
New York	†7.50
Pittsburgh	14.00-14.50
St. Louis	†8.50- 9.00
San Francisco	5.00
Toronto, dealers	7.00- 7.25
Valleys	11.50-12.00

SHOVELING TURNINGS

Buffalo	13.00-13.50
Cleveland	12.00-12.50
Chicago	12.50-13.00
Chicago, spcl, anal.	15.50-16.00
Detroit	†12.00-12.50
Pitts., alloy-free	16.00-16.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†5.25- 5.75
Buffalo	10.50-11.00
Cincinnati, dealers.	6.50- 7.00
Cleveland	12.00-12.50
Eastern Pa.	11.00-11.50
Detroit	†10.50-11.00
New York	†7.50- 8.00
Pittsburgh	11.50-12.00
Toronto, dealers	6.75

AXLE TURNINGS

Buffalo	16.00-16.50
Boston district	†9.00- 9.50
Chicago, elec. fur.	17.50-18.00
East. Pa. elec. fur.	17.50-18.00
St. Louis	†12.00-12.50
Toronto	6.00- 6.50

CAST IRON BORINGS

Birmingham	8.00
Boston dist. chem.	†8.25- 8.50
Buffalo	10.50-11.00
Chicago	10.75-11.25
Cincinnati, dealers.	6.50- 7.00
Cleveland	12.00-12.50
Detroit	†11.00-11.50
E. Pa., chemical	14.50-15.00
New York	†8.00- 8.50
St. Louis	†7.00- 7.50
Toronto, dealers	6.75

RAILROAD SPECIALTIES

Chicago	21.50-22.00

ANGLE BARS—STEEL

Chicago	21.00-21.50
St. Louis	†18.00-18.50

SPRINGS

Buffalo	21.00-21.50
Chicago, coil	22.50-23.00
Chicago, leaf	22.00-22.50
Eastern Pa. crops	25.00
Pittsburgh	25.00-25.50
St. Louis	†19.00-19.50

STEEL RAILS, SHORT

Birmingham	17.00
Buffalo	22.50-23.00
Chicago (3 ft.)	21.50-22.00
Chicago (2 ft.)	22.50-23.00
Cincinnati, dealers.	22.50-23.00
Detroit	†22.50-23.00
Pitts., 3 ft. and less	25.00-25.50
St. L., 2 ft. & Less.	†20.75-21.25

STEEL RAILS, SCRAP

Birmingham	15.50
Boston district	†14.50-15.00
Buffalo	19.00-19.50
Chicago	18.50-19.00
Cleveland	22.00-23.00
Pittsburgh	22.00-22.50
St. Louis	†19.00-19.50
Seattle	18.00-18.50

PIPE AND FLUES

Chicago, net	12.50-13.00
Cincinnati, dealers.	12.00-12.50

RAILROAD GRATE BARS

Buffalo	13.00-13.50
Chicago, net	13.00-13.50
Cincinnati, dealers.	11.00-11.50
Eastern Pa.	17.00
New York	†12.50-13.00
St. Louis	†10.50-11.00

RAILROAD WROUGHT

Birmingham	14.00
Boston district	†9.50-10.00
Eastern Pa., No. 1.	20.00-21.00
St. Louis, No. 1	†14.00-14.50
St. Louis, No. 2	†15.00-15.50

FORGE FLASHINGS

Boston district	†11.00-11.50
Buffalo	16.50-17.00
Cleveland	18.00-18.50
Detroit	†15.75-16.25
Pittsburgh	17.50-18.00

FORGE SCRAP

Boston district	†7.00
Chicago, heavy	22.50-23.00

LOW PHOSPHORUS

Cleveland, crops	24.50-25.00
Eastern Pa. crops	25.00
Pitts., billet, bloom, slab crops	25.50-26.00

LOW PHOS. PUNCHINGS

Buffalo	21.00-21.50
Chicago	20.50-21.00
Cleveland	20.50-21.00
Eastern Pa.	24.00-25.00
Pittsburgh	24.50-25.00
Seattle	15.00
Detroit	†18.00-18.50

RAILS FOR ROLLING

5 feet and over

Birmingham	16.50
Boston	†15.75-16.00
Chicago	22.00-22.50
New York	†18.00-18.50
Eastern Pa.	22.00-22.50
St. Louis	†21.00-21.50

STEEL CAR AXLES

Birmingham	18.00
Boston district	†18.00-18.50
Chicago, net	22.50-23.00
Eastern Pa.	23.50-24.00
St. Louis	†21.50-22.00

LOCOMOTIVE TIRES

Chicago (cut)	22.00-22.50
St. Louis, No. 1	†18.00-18.50

SHAFTING

Boston district	†18.50-19.00
New York	†19.50-20.00
Eastern Pa.	23.50-24.00
St. Louis, 1¼-3¾".	†18.50-19.00

CAR WHEELS

Birmingham, iron	13.00
Boston dist., iron	†14.75-15.00
Buffalo, steel	23.00-23.50
Chicago, iron	18.50-19.00
Chicago, rolled steel	22.00-22.50
Cincin., iron, deal.	18.00-18.50
Eastern Pa., iron	22.00-22.50
Eastern Pa., steel	24.50-25.00
Pittsburgh, iron	20.00-20.50
Pittsburgh, steel	25.00-25.50
St. Louis, iron	†16.50-17.00
St. Louis, steel	†19.50-20.00

NO. 1 CAST SCRAP

Birmingham	15.50
Boston, No. 1 mach.	†16.00-16.50
N. Eng. del. No. 2	14.75-15.00
N. Eng. del. textile	18.00-18.50
Buffalo, cupola	18.50-19.00
Buffalo, mach.	20.00-20.50
Chicago, agri. net	15.00-15.50
Chicago, auto net	17.00-17.50
Chicago, railroad net	16.00-16.50
Chicago, mach. net	16.50-17.00
Cincin., mach. deal.	19.50-20.00
Cleveland, mach.	22.50-23.00
Detroit, cupola, net.	†17.00-17.50
Eastern Pa., cupola	21.00-21.50
E. Pa., No. 2 yard	18.00-18.50
E. Pa., yard fdry.	18.00-18.50
Los Angeles	16.50-17.00
Pittsburgh, cupola	20.00-20.50
San Francisco	14.50-15.00
Seattle	12.00-14.00
St. L., agri. macn.	†17.00-17.50
St. L., No. 1 mach.	†18.75-19.25
Toronto, No. 1 mach., net dealers	18.00-18.50

HEAVY CAST

Boston dist. break.	†14.75-15.00
New England, del.	15.00-15.25
Buffalo, break	16.50-17.00
Cleveland, break, net	15.50-16.00
Detroit auto net	†17.50-18.00
Detroit break	†16.00-16.50
Eastern Pa.	20.50-21.00
Los Ang., auto, net.	13.00-14.00
New York break	†16.50-17.00
Pittsburgh, break	17.50-18.00

STOVE PLATE

Birmingham	10.00
Boston district	†11.00-11.50
Buffalo	14.50-15.00
Chicago, net	11.50-12.00
Cincinnati, dealers.	11.50-12.00
Detroit, net	†11.00-11.50
Eastern Pa.	17.00
New York fdry.	†12.75
St. Louis	†12.50-13.00
Toronto dealers, net	12.00

MALLEABLE

New England, del.	21.50-22.00
Buffalo	20.00-20.50
Chicago, R. R.	21.50-22.00
Cincin. agri., deal.	15.50-16.00
Cleveland, rail	22.50-23.00
Eastern Pa., R. R.	22.00-22.50
Los Angeles	12.50
Pittsburgh, rail	24.00-24.50
St. Louis, R. R.	†18.50-19.00

Ores

Lake Superior Iron Ore

Gross ton, 51½ %

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	10.00

Foreign Ore

Cents per unit c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mn. (asking price; no sales)	19.00
North African low phos. (asking price; no sales)	19.00-20.00
Spanish, No. African basic, 50 to 60% (asking price; no sales)	19.00-20.00
Chinese wolframite, short ton unit, duty paid	$23.50-24.00
Scheelite, imp.	$25.00
Chrome ore, Indian, 48% gross ton, cif.	$28.00-30.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	nom.
So. African, 50-52%	57.00
Indian, 49-50%	nom.
Brazilian, 46%	50.00-53.00
Cuban, 50-51%, duty free	71.00-73.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Sheets, Strip

Sheet & Strip Prices, Page 84, 85

Pittsburgh—Sheet demand is picking up generally, with releases on earlier placements on the books for immediate shipment. In addition there is new business from industry generally, mostly to cover future needs, as a result of uncertainty as to steel supply later on, and does not necessarily represent actual needs.

Chicago — Market is quiet, except for considerable new buying from warehouses. Specifications on the large April low-priced tonnages showed little increase in the past week. Approximately 75 per cent of the material has been specified and will be shipped by July 1, though some carry-over appears necessary.

Boston — Orders for cold strip specialties are heavier. Specifications against blanket low-priced coverage are more active, accompanied by considerable new buying. Hot strip releases are mounting. Sheet buying is spotty and light and releases against orders taken late in April are inclined to drag.

New York — Some sheet sellers are extending their deadline on shipment of bargain tonnage sold last April from June 30 to July 31, with final specifications to be in by the end of this month.

Consumers will not be allowed to increase tonnage in the original contracts, it is emphasized; the present action, it is explained, simply permits longer time for specifying.

Cold strip releases against low-priced tonnage are heavier and rolling operations in some instances have been increased to around 80 per cent of capacity and still rising. June production will be the largest since early in the year, but some tonnage will probably go over the June 30 dead-line for shipment of low-priced material. Deliveries are slightly more extended. There is some fair buying for third quarter delivery and incoming orders and releases are now in excess of shipments, which are heavier.

Philadelphia—Sheet sellers are extending the deadline of delivery of orders at concessions in April until July 31, with specifications to be in by June 30. This applies to hot and cold-rolled sheets but not to galvanized.

Buffalo — Sheet production is at a high rate with one interest continuing five-day operation.

Cincinnati—Export demand added to low-priced tonnage for delivery this month is carrying production close to capacity. Carryover, principally on special grades, will be slight. Third quarter tonnage taken thus far is accompanied by request for early delivery.

St. Louis — Manufacturers and distributors of sheets and strip report some business since June 1. Purchasing, however, is largely hand-to-mouth. Sellers expect increased buying during the next two or three weeks, contingent upon war developments. Latest reports indicate current production about equal to deliveries.

Birmingham, Ala. — Sheet production has shown moderate gains during the past few weeks. Output is at 80 per cent or better in sheets, and relatively high in strip with approach of a new cotton ginning season.

Toronto, Ont. — Heavy government orders for motor vehicles on war account is reflected in sharp increase in demand for sheets and other materials. Most new sheet demand, however, is said to be going to United States producers as Canadian mills have no materials available for spot delivery on new orders. Canadian mill representatives

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state that new future delivery booking is continuing at a high rate and orders now are being taken into September, and practically no sheets on new order account are available for delivery before August.

Plates

Plate Prices, Page 84

Boston — Additional contracts allotted New England yards for four destroyers and six submarines will require 11,000 tons of steel, mainly plates. Navy yards at Boston and Portsmouth, N. H., private yards at Bath, Me., and Groton, Conn., will build the ships. Miscellaneous demand for plates is improving, and, although less-than-car lot orders predominate, scattered individual larger specifications are appearing.

New York—Miscellaneous plate demand is increasing. Fabricated tanks, especially for oil companies, are more active. Utilities are specifying more freely and municipal demand is larger, though not as great as a year ago. Probable lessening of federal aid to local projects is deemed a cause. Considerable plate demand is expected from the government in the preparedness effort. Private construction is on the increase. Shipyards are consuming a substantial tonnage for ship construction and repairs. Railroads and car builders are expected in the market shortly.

Philadelphia—Plate mills are receiving steady orders, though accumulating little backlog. Shipyard releases are more active and railroads are buying more freely. Mills in this district took about 6000 tons of plates for the Virginian railroad car building program and are booking increasing volume from the Pennsylvania for car repairs. Baldwin Locomotive Works will require more than 600 tons of plates for 12 locomotives for the Western Maryland. The 45,000-ton battleship placed with the Philadelphia navy yard will require about 22,000 tons, mainly plates.

Birmingham, Ala.—Current plate output is going largely to tank manufacturers and shipbuilding on the Gulf coast. Current bookings are brisk, and some backlog remains, specifications against which have picked up materially in the past few weeks.

San Francisco — The only plate award of size went to Consolidated Steel Corp., 400 tons for caissons at Pearl Harbor, T. H. Awards so far this year total 29,723 tons, compared with 17,249 tons for the same period a year ago. Interest now centers around the opening of bids June 25 by the metropolitan water district, Los Angeles, for welded steel pipe, reinforced concrete pipe or cast iron pipe for a line between Burbank and Santa Monica, Calif., 3300 to 6100 tons, depending upon what type of pipe is selected.

Seattle — Plant operations are hampered by labor troubles. Inquiry is slow, no large projects being up for figures. Announcement is expected soon on Richfield Oil Co.'s proposed construction of large steel tank storage facilities here. In lots of less than 100 tons, demand is seasonally normal.

Toronto, Ont. — With Canadian heavy steel plants beginning production of tanks for the British government, demand for plates has started a new upswing. However, steel for tanks will be upwards of four inches in thickness and as no plate of this size is produced in Canada, it will be imported either from the United States or Britain. Demand for plates for ship construction and boiler and tank needs is holding at a good level, but imports are necessary as Canadian

The Blaw-Knox Bucket illustrated is a two-line, hook-on type, 3 cubic yards capacity. It weighs 19,400 lbs. and is equipped with Chrome Nickel Moly lips cast in one piece. Its operating head room reeved with two parts of line is 16'7", with three parts of line 23'5". This and other modern Blaw-Knox buckets have progressed with steel mill practice and equipment.

BLAW-KNOX
BLAW-KNOX DIVISION
• OF BLAW-KNOX CO. •
Farmers Bank Bldg. · Pittsburgh, Pa.
Digging and Rehandling
BUCKETS

producers are booked to capacity for months.

Plate Contracts Placed

760 tons, three tanks, Sinclair Refining Co., Baltimore, to Chicago Bridge & Iron Works, Chicago.

400 tons, caissons, Pearl Harbor, T. H., to Consolidated Steel Corp., Los Angeles.

225 tons, 4500 feet of 32-inch steel pipe, Wadhams & Westport Power & Light Co., Westport, N. Y., to Alco Products Inc., New York.

Unstated tonnage, two welded steel barges, United States engineer, first district, New Orleans, to Treadwell Construction Co., Midland, Pa.

Plate Contracts Pending

3300 to 6100 tons, welded steel, precast reinforced concrete pipe or cast iron pipe, specification 333, metropolitan water district, Los Angeles; bids June 25.

Bars

Bar Prices, Page 84

Pittsburgh—Merchant bar bookings are increasing, both in domestic and export markets. European competition has virtually ended and inquiries are increasingly heavy. Domestic buyers are being urged to cover all probable needs as soon as possible to avert possible shortage should the industry be forced to mobilize for national defense and curtail production on normal needs.

Chicago — Volume of buying has leveled off somewhat but still is large. Government work accounts for almost half of present orders, either directly or indirectly. Warehouse needs are prominent, distributors finding extended mill delivery schedules require heavier forward coverage. Automotive interests are not active. Agricultural implement sources are well covered on near-future needs.

Boston — Bar demand is maintained at the recent improved rate with consumption heavier in some directions, notably for work indirectly connected with the defense program. Deliveries are somewhat further extended for most grades of alloys and heat-treated stock; also several smaller sizes. Machine tool builders are leading users with most forge and small tool shops working off more material.

The navy closes bids June 21 at Washington on 115 tons pearlitic manganese bars for Newport, R. I., delivery.

New York — With government shops now on a 24-hour basis, heavy increase in bar specifications is expected. Meanwhile, specifications from airplane equipment manufacturers and machine tool builders are increasing. Miscellaneous demand, however, has been stepped up only moderately. Tredegar Co., Richmond, Va., is low on 58,000 five and six-inch target projectiles, and Lansdowne Steel & Iron Co., Philadelphia, on 5000 illuminating projectiles for the bureau of ordnance, navy department, bids June 4, Washington.

Philadelphia—Carbon bar deliveries are still available within three to four weeks, but some producers are unable to meet this schedule. Business is expanding, with forgers, machine tool builders, chain and marine accessory manufacturers and ship yards leading.

Buffalo—Bar production is increasing with demand for other steel products. Bar mills are operating three to six days a week, to meet delivery requests.

Birmingham, Ala. — Bar production, while not quite equal to plates and some other specifications, is satisfactory. Demand for merchant bars is steady on the part of manufacturers of agricultural implements.

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"A VERY GOOD QUESTION, MR. BLUEPRINTER — HERE'S WHAT 30 YEARS OF CONSTANT RESEARCH HAVE TAUGHT US."

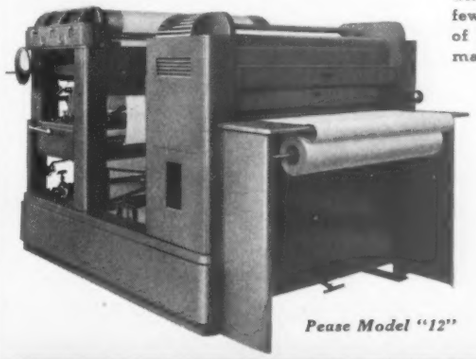
"All tracings have inequalities in them from the pencil, ink, erasures and even in the paper or cloth itself. In any method of continuous contact, these inequalities develop bulges or waves in the tracings, particularly large ones, but Sliding Contact has the action of smoothing away these bulges before they can become hard pressed creases or tears, under the tension of the contact band."

"Just like smoothing out a shirt with your hands before ironing it, eh?"

"Exactly—and furthermore, with its single, endless belt, Sliding Contact holds the same tension over the entire surface of the tracings, no matter how large."

"Then the single belt is better for contact?"

"Emphatically, yes. And, also, the stationary contact glass does not require perfect end diameters to keep the tracing going straight and maintain even contact. Both sides travel at the same speed."



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"It sounds fine."

"Mr. Blueprinter, there is nothing to prevent our using any known method of contact and, needless to say, our engineers have experimented exhaustively with all of them. In Sliding Contact we are choosing the method which has the most universal application and fewest troubles. By far the greatest number of Blueprinters use Sliding Contact which makes us feel that we have chosen wisely."

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Write in for full particulars on the above and additional Pease features.

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Pipe

Pipe Prices, Page 85

Pittsburgh—Pipe mill activity continues. Nonintegrated plants have increased their orders for skelp and rounds, however, and are apparently increasing inventories.

Boston — Releases against annual cast pipe contracts are slow and buying is light in small lots, involving several hundred tons for Boston, Gardner and Swampscott, Mass., while Melrose has placed a blanket contract for the balance of the year requirements. Cast pipe shipments are estimated around 40 per cent under last year. Several larger projects have been lost to cast pipe foundries because of lower prices quoted on cement-asbestos material.

San Francisco—Demand for cast iron pipe has fallen off and few inquiries are in the market. Action has been delayed on 1250 tons of 6 to 12-inch pipe for Long Beach, Calif. Bids have been taken on 180 tons of 4 to 8-inch pipe for Sacramento, Calif. The metropolitan water district, Los Angeles, will open bids June 25 for about 8300 tons of 28 and 32-inch cast iron, welded steel or reinforced concrete pipe. To date this year 14,555 tons have been placed, compared with 13,471 tons for the corresponding period in 1939.

Seattle — Inquiry is confined to lots under 100 tons each. H. G. Purcell, Seattle, has been awarded 200 tons of 2 to 6-inch cast iron for the Powell Valley water district, Portland. Consolidated Supply Co., Portland, has taken 12 miles of 2, 3 and 4-inch steel pipe for the Wolf Creek extension, Portland, Oreg., a $56,778 WPA project.

Cast Pipe Placed

200 tons, 2 to 6-inch, Powell valley water district, Portland, Oreg., to H. G. Purcell, Seattle, for United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

8300 tons, 28 and 32-inch cast iron, metropolitan water district, Los Angeles, specification 333, alternate on welded and reinforced concrete pipe; bids June 25.

Steel Pipe Placed

Unstated, 12 miles of 2 to 4-inch, Wolf creek water district, Portland, Oreg., to Consolidated Supply Co., Portland, Oreg.

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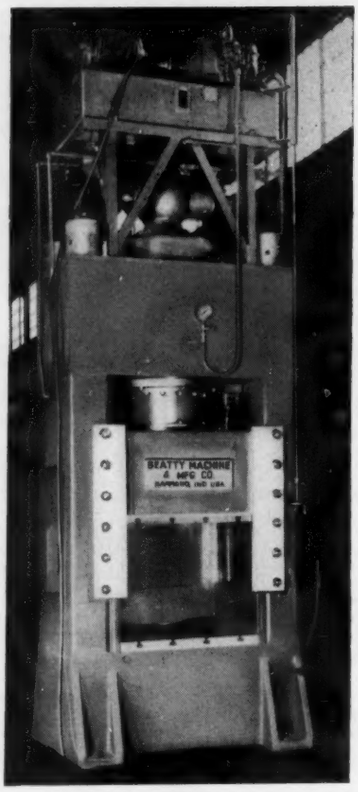

The illustration and the table below covers standard pattern high speed press for prompt delivery.

NOTE THE OPERATING SPEEDS AS SHOWN IN TABLE BELOW:

Nos.	Cap. in tons	Size platen (inches)	Max. opening (inches)	Stroke (inches)	Operating speeds per minute in inches Advance	Pressing	Return	H.P. Motor
300 300-A	200 300	36x36	30	18	510	11	475	10 to 25
400 400-A 400-B	400 500 750	42x42	48	26	510	11	475	20 to 30
500 500-A 500-B	400 500 750	60x60	48	26	510	11	475	20 to 30

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Wire

Wire Prices, Page 35

Pittsburgh—Buying has developed in many wire products from domestic sources in the midwest and far west. Releases have been forthcoming on almost all previous tonnage and new material is being placed to cover manufacturing needs for several months. Warehouses have been increasing stocks considerably in eastern sections.

Chicago—Demand has increased somewhat, but improvement has not been consistent. Though a number of large orders have been placed recently, demand still is below earlier expectations. Auto springmakers are reported hesitant. Best volume is coming from agricultural implement makers, novelty interests, and bolt and nut manufacturers.

Boston — Incoming wire volume is higher, with demand broadening, although specialties and manufacturers' wire lead. Rope, electric cable and spring wire are more active, marine demand for the former and government orders for cable expanding. Consumers are covering through third quarter in more in-

stances and some users seek protection through the fourth, although sellers are reluctant to book tonnage for shipment beyond September.

New York — Wire orders continue to improve, incoming volume on specialties and manufacturers' wire being notable, with demand covering a wide range of products. Spring wire is more active, automotive specifications increasing; also bedspring requirements. More buyers are covering through third quarter. Mill backlogs are again being built up with incoming volume better than 85 per cent of capacity in some departments and even higher for others, which are operating full schedules.

Rails, Cars

Track Material Prices, Page 85

Railroad buying took an upward trend last week, 16 steam locomotives and 3260 freight cars being placed. This total for one week exceeds buying of any full month since October, 1939. Mobile & Ohio has asked court authorization of a program costing $3,265,000, including 1000 box and 250 hopper cars and two diesel-electric locomotives.

Purchase of 12 steam locomotives by the Western Maryland is the largest for this class of equipment in several months.

Car Orders Placed

Great Northern, 500 boxcars and 250 hoppers to Pullman-Standard Car Mfg. Co., Chicago; 500 boxcars to Pressed Steel Car Co., McKees Rocks, Pa.

Gulf, Mobile & Northern, 1000 boxcars to American Car & Foundry Co., New York.

Minneapolis, St. Paul & Sault Ste. Marie, 500 boxcars to Pullman-Standard Car Mfg. Co., Chicago.

Tennessee Coal, Iron & Railroad Co., 10 gondolas, to Pullman-Standard Car Mfg. Co., Chicago.

Virginian, 500 fifty-tone hoppers, to own shops at Princeton, W. Va.; previously noted as contemplated and will be the third lot of 500 constructed at these shops over a period of several months.

Locomotives Placed

Detroit, Toledo & Ironton, four steam locomotives to Lima Locomotive Works, Lima, O.

Western Maryland, twelve 4-6-6-4 type locomotives to Baldwin Works, Eddystone, Pa.

Car Orders Pending

Mobile & Ohio, 1000 box, 250 hoppers; court approval asked.

Seaboard Airline, 18 coaches, bids asked.

Locomotives Pending

Mobile & Ohio, two diesel-electric passenger locomotives; court approval asked.

Tin Plate

Tin Plate Prices, Page 84

Tin plate operations have apparently leveled off, although there is nothing to indicate the current rate of 76 per cent marks the top of the movement. Mills now in operation are mostly at capacity, but several plants are not yet operating, and current estimates by tin plate sellers indicate there is little likelihood of their being called into play soon.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices Page 35

While bolt and nut makers have made no formal declarations as to third quarter prices, they are beginning to book business for delivery beyond the end of this month at unchanged prices. Both domestic

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and export business, particularly the latter, is expanding appreciably. Great Britain continues to be a leading buyer not only for England but for various colonies.

Shapes

Structural Shape Prices, Page 84

New York—Heavier requirements for industrial expansions and increased number of projects planned for navy yards and government shops feature the structural steel outlook. Bids go in this week on 8000 tons for a grade crossing in Brooklyn.

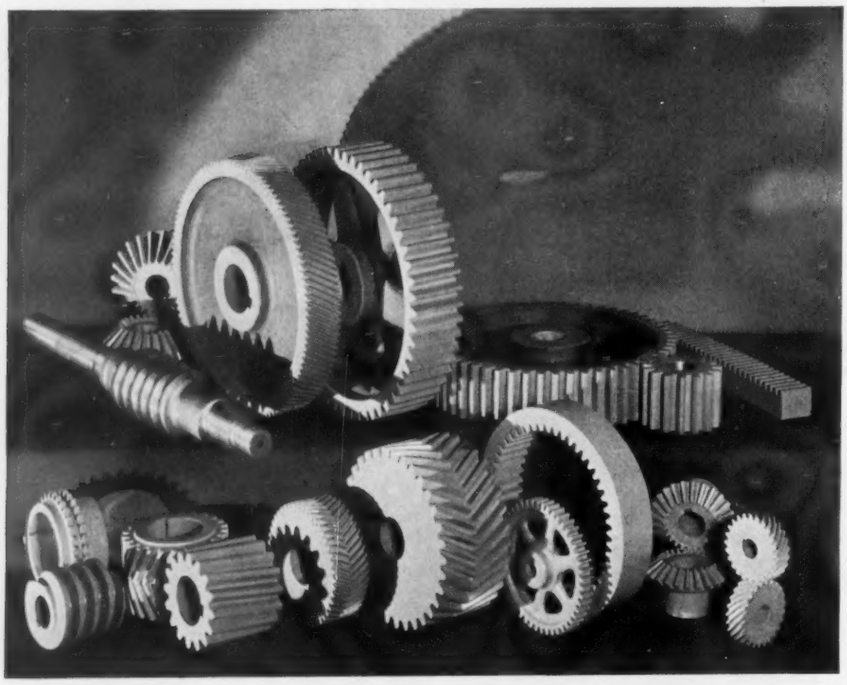
Boston — Structural steel lettings include additional industrial plant expansions. Bridge contracts involve 410 tons, shapes, piling and bars, for Warwick, R. I., and, while inquiry covers small spans mostly, two state projects, Chelmsford-Lowell, Mass., take 300 tons.

Philadelphia—Current shape buying is moderate but considerable tonnage is under consideration for early inquiry, principally industrial work. Fabricators have a four to five weeks backlog.

San Francisco — The structural shape market was active last week and 7357 tons were booked, bringing the aggregate for the year to 96,664 tons, compared with 65,816 tons for the corresponding period in 1939. Pending business is heavy and calls for more than 25,000 tons.

Seattle—Business is fair, although a local machinist strike is retarding operations. Because of this condition, Pacific Car & Foundry Co., Seattle, awarded 2100 tons for the Boeing Seattle aircraft plant extension, has sublet over half the tonnage to eastern fabricators. Columbia Steel Co. has the award for 1200 tons for the army hangar, Fairbanks, Alaska. Bethlehem Steel is reported to have an additional 1200 tons for the Aluminum Co. of America's Vancouver, Wash., plant, placed through the San Francisco office.

Toronto, Ont. — While orders for structural steel closed during the past couple of weeks were below the high average for the year, prospective business is heavy. In connection with the new $20,000,000 projects for the Canadian, French and British governments in Canada for explosives production, and some other large undertakings on war account, it is estimated some 15,000 tons of steel will be required.



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Shape Contracts Placed

3800 tons, state hospital buildings, Deer Park, N. Y., to American Bridge Co., Pittsburgh, through P. J. Carlin Construction Co., New York.

2300 tons, building additions, Celanese Corp. of America, Celco, Va., to Virginia Bridge Co., Roanoke, Va.; Virginia Engineering Co. Inc., Newport News, Va., general contractor.

1635 tons, terminal building and hangar, Gravelly Point, Va., to Virginia Bridge Co., Roanoke, Va.

1500 tons, assembly and repair shop, bureau of yards and docks, navy department, specification 9671, Jackson-

Shape Awards Compared

	Tons
Week ended June 15	22,430
Week ended June 8	16,137
Week ended June 1	24,692
This week, 1939	15,598
Weekly average, year, 1940	18,269
Weekly average, 1939	22,411
Weekly average, May	22,717
Total to date, 1939	550,235
Total to date, 1940	438,470

Includes awards of 100 tons or more.

ville, Fla., to Jones & Laughlin Steel Corp., Pittsburgh.

1200 tons, army hangar, Fairbanks, Alaska, to Columbia Steel Co., San Francisco.

1200 tons, additional tonnage for Alcoa plant, Vancouver, Wash., to Bethlehem Steel Co., San Francisco.

950 tons, powerhouse, Utility Management Corp., Reading, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

825 tons, Youghiogheny dam, Confluence, Pa., to Youngstown Car & Foundry Co., Youngstown, O.

775 tons, state highway bridge, Rock Springs, Wyo., to American Bridge Co., Pittsburgh.

550 tons, bridges, North Dakota, Montana and Washington, for Great Northern railway, to American Bridge Co., Pittsburgh.

450 tons, alterations to power house, for West Penn Power Co., Power, W. Va., to Fort Pitt Bridge Works, Pittsburgh.

440 tons, repairs to south side elevated lines, for Chicago Rapid Transit, Chicago, to Hansell-Elcock Co., Chicago.

425 tons, boiler house unit No. 8, Windsor, W. Va., to Fort Pitt Bridge Works, Pittsburgh.

410 tons, including piling and 110 tons for temporary track supports, underpass, Warwick, R. I., to Bethlehem Steel Co., Bethlehem, Pa.; General Engineering & Contracting Co., Providence, R. I., general contractor.

375 tons, state bridge over New York Central railroad, Erie, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

355 tons, state highway bridges, Devol, Cotton county, Okla., to Patterson Steel Co., Tulsa, Okla.

345 tons, power house addition, Hutsonville, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

300 tons, two bridges, Chelmsford-Lowell, Mass., to American Bridge Co., through Lane Construction Corp., Meriden, Conn.

300 tons, coal handling plant, Orient, Ill., to Vincennes Steel Corp., Vincennes, Ind.

275 tons, Shetucket river, Sprague, Conn., to American Bridge Co., Pittsburgh.

260 tons, power house alterations and bunker, for Ohio Public Service Co., Warren, O., to American Bridge Co., Pittsburgh.

260 tons, converter building extensions, for Phelps Dodge Corp., Douglas, Ariz., to Kansas City Structural Steel Co., Kansas City, Kans.

230 tons, state bridge 367, Warwick, R. I., to Bethlehem Steel Co., Bethlehem, Pa.

220 tons, bridge, Cody, Wyo., for bureau of public roads, to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, telephone building, Fall River, Mass., to James T. Cox & Co., Fall River; E. Turgeon, Providence, R. I., general contractor.

200 tons, New York state highway bridge FARC-40-25, Orange county, New York, to American Bridge Co., Pittsburgh.

200 tons, factory building, for American Metal Products Co., Detroit, to Bethlehem Steel Co., Bethlehem, Pa.

195 tons, state bridge, Schuylkill county, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

170 tons, alterations and additions, Brown & Sharpe Mfg. Co., Providence, R. I., to Providence Steel & Iron Co., Providence; Central Engineering & Construction Co., Pawtucket, R. I., general contractor.

170 tons, addition to building, for Florence Oil Stove Co., Gardner, Mass., to Haarmann Steel Co., Holyoke, Mass.

165 tons, bridge FAS-201A, joining Lowndes and Brooks counties, Georgia, and Madison county, Florida, to unstated fabricator.

155 tons, highway bridge, Ashtabula county, Ohio, to Fort Pitt Bridge Works, Pittsburgh.

150 tons, pumping station, for army Wilkes-Barre, Pa., to Pine Brook Iron Works, Scranton, Pa.

150 tons, TVA-243853 and 243962 trash racks, Wheeler dam, Alabama, to Lakeside Bridge & Steel Co., Milwaukee.

140 tons, garage addition, United Electric railway, Pawtucket, R. I., to American Bridge Co., Pittsburgh.

140 tons, warehouse, garage and maintenance building, Fairbanks, Alaska, for United States navy, to Milwaukee Bridge Co., Milwaukee.

140 tons, state bridge FA-739-CD, Manning, Iowa, to Pittsburgh Des Moines Steel Co., Neville Island, Pittsburgh.

130 tons, bridge SAP-591B, Quitman, Ga., to Virginia Bridge Co., Roanoke, Va.

120 tons, state highway bridges, Field-

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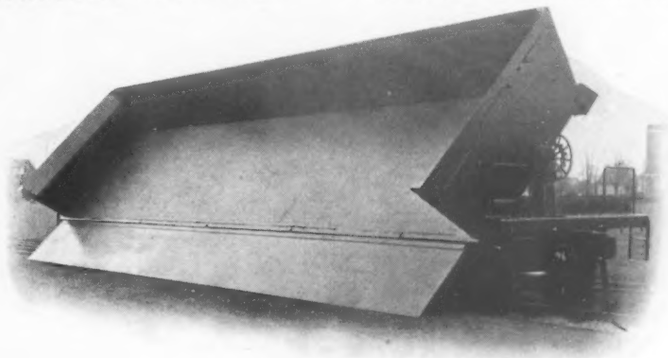

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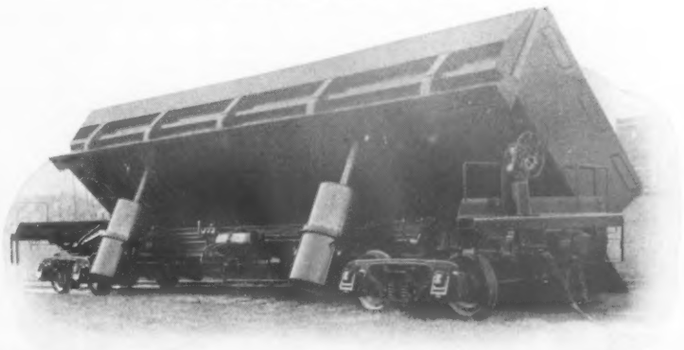

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more Springs, Pa., to American Bridge Co., Pittsburgh.

125 tons, H columns, two bridges at Pescadero, San Mateo county, Calif., for state, to Columbia Steel Co., San Francisco.

110 tons, bridge over north fork Milk river, Zurich, Mont., to Pittsburgh Des Moines Steel Co., Pittsburgh.

110 tons, building for Drackett Chemical Co., Cincinnati, to Bethlehem Steel Co., Bethlehem, Pa.

100 tons or more, building addition, Bayer Co., Rensselaer, N. Y., to Clausen Iron Co., Albany; bars to Bethlehem Steel Co., Bethlehem, Pa.; William G. Sheehan Construction Co., Albany, general contractor.

Unstated tonnage, structural steel caisson gates and appurtenances, dry dock No. 3, Pearl Harbor, T. H., and dry dock No. 4, Mare Island, Calif., to Consolidated Steel Corp. Ltd., Los Angeles, bids May 29, spec. 9488.

Shape Contracts Pending

10,000 tons, grade crossing elimination, contract 4, Long Island railroad, Rockaway Beach, New York; bids June 27.

3500 tons, board of transportation building, New York; out for bids soon.

2500 tons, Benjamin Franklin high school, New York; bids June 25.

2500 tons, Woodrow Wilson high school, New York; bids postponed to June 21.

1900 tons, boiler house, factory and office building, for Curtiss-Wright Corp., Caldwell township, New Jersey.

1800 tons, four storehouses, naval supply depot, Oakland, Calif.; general contract to P. N. Severin, 222 West Adams street, Chicago, at $1,050,000.

1300 tons, plant building, Carpenter Steel Co., Reading, Pa.

900 tons, state bridge, Highland, Pa.

627 tons, including 362 tons bearing piles and 165 tons sheet piling, Brea dam, Orange county, California; general contract to Winston Bros., 411 West Fifth street, Los Angeles, at $664,401.

550 tons, including 144 tons of H columns and 45 tons of sheet piling, bridge near Safford, Ariz.; bids opened.

550 tons, extension to machine shop building 18, Philadelphia, for bureau of yards and docks.

540 tons, tuberculosis hospital, Riverside hospital, New York, for city.

530 tons, warehouse and making-up building, for Crompton-Shenandoah Co., Waynesboro, Va.

520 tons, addition to building, for St. Vincent hospital, New York.

450 tons, state bridge, Sussex county, New Jersey; bids June 21.

450 tons, including 270 tons sheet piling, bridge over Los Angeles river between Balboa boulevard and White Oaks avenue, Los Angeles; bids opened.

430 tons, state bridge, Clearfield county, Pennsylvania.

410 tons, stadium, Pawtucket, R. I., to Bethlehem Steel Co., Bethlehem, Pa.; J. J. McHale & Sons Inc., Pawtucket, general contractor.

400 tons, state bridge RC-4036, Wellsburg, N. Y.

365 tons, grade crossing elimination, Wilton, Conn., for state.

350 tons, state bridge, Powerton, Ill.

340 tons, state bridge RC-4038, Williamsville, N. Y.

330 tons, addition to factory, Goodyear Tire & Rubber Co., St. Marys, O.

330 tons, store building, Sears, Roebuck & Co., Wheeling, W. Va., for Hazlett estate.

320 tons, also 126 tons cast steel, Great Northern railroad bridge, Kettle Falls, Wash.; bids to Denver, July 1.

310 tons, extensions to building 57, for General Electric Co., West Lynn, Mass.

300 tons, building, Broadway and Fulton streets, New York.

300 tons, state bridge RC-4029, Norwood, N. Y.

300 tons, state bridges, Lowell, Mass.

300 tons, Perry memorial trade school, Yakima, Wash.; Howard S. Wright, Seattle, general contractor.

290 tons, shop addition, Pratt & Whitney division, United Aircraft Corp., East Hartford, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., New York, general contractor.

270 tons, converter plant, for Anaconda Copper Mining Co., Butte, Mont.

270 tons, state bridge, Marion county, West Virginia.

260 tons, bridge, Northumberland county, Pennsylvania.

225 tons, highway mesh, project RC-40-17, Salamanca-Little Valley, N. Y., to American Steel & Wire Co., New York; Holmes & Murphy, Orchard Park, N. Y., contractors, $264,768.25, bids May 15, Albany.

220 tons, power plant, building 60, Bing-

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hamton, N. Y., for state.

210 tons, truck terminal and warehouse, for American Terminal Co., Cincinnati.

200 tons, bridge, Sepulveda dam, Van Nuys, Calif., for army engineers.

200 tons, underpass at Missouri Pacific tracks, Gravois avenue, St. Louis; G. L. Tarleton Co., St. Louis, general contract.

180 tons, state bridge PSC-6004, Erie county, New York.

165 tons, salvage building, for Westinghouse Electric & Mfg. Co., Sharon, Pa.

147 tons, Louise street bridge, Glendale, Calif.; bids opened.

140 tons, bridge reconstruction, Bennett street, Hornell, N. Y., for city.

130 tons (including 40 tons reinforcing) dock buildings at Puget Sound navy yard, Washington; A. F. Mowat, Seattle, general contractor.

130 tons, state bridges, Spearfish, S. Dak.

130 tons, grade crossing elimination, Long Island, N. Y., for Long Island railroad.

125 tons, state bridge, Pearl City, Ill.

120 tons, mess hall and bakery, Kodiak, Alaska, for United States navy.

120 tons, bear trap repair parts, locks 12 and 13, Neville Island, Pa., for army engineers.

110 tons, I-beam bridge, Chester county, Pennsylvania; bids to state highway department, Harrisburg, Pa., June 21.

Unstated, railroad bridge, two highway spans and metal flume, Roza project, Washington state; bids to reclamation bureau, Denver, June 25.

Unstated, gantry crane, Pearl Harbor navy base; Star Iron & Steel Co., Tacoma, apparently low at $99,870.

Reinforcing

Reinforcing Bar Prices, Page 85

New York—Since effort to stabilize reinforcing prices has been made buying has been in small lots affording little test. Several large projects may make a real test.

Chicago—Volume of bookings has expanded. Small-lot tonnages are numerous and keep sellers well occupied. Roadbuilding requirements are prominent. Construction needs, particularly through government agencies, are heavy. New published prices range billet steel from 1.70c to 1.90c, rail steel from 1.70c to 1.80c.

Pittsburgh—Inquiry is voluminous although average tonnage per job is apparently declining. Prices are unchanged, mostly about 1.80c to 1.90c on new billet steel, with export prices 2.00c. Export demand is increasing. Mills report plenty of capacity for all present orders.

Boston — Attempts to steady the price of billet steel reinforcing bars at 1.90c, base, have not been subject to much test, most of heavier buying, which includes 500 tons for an office building, Hartford, and 400 tons, stadium, Pawtucket, R. I., having been done before the move. Most inquiry and buying is for small lots.

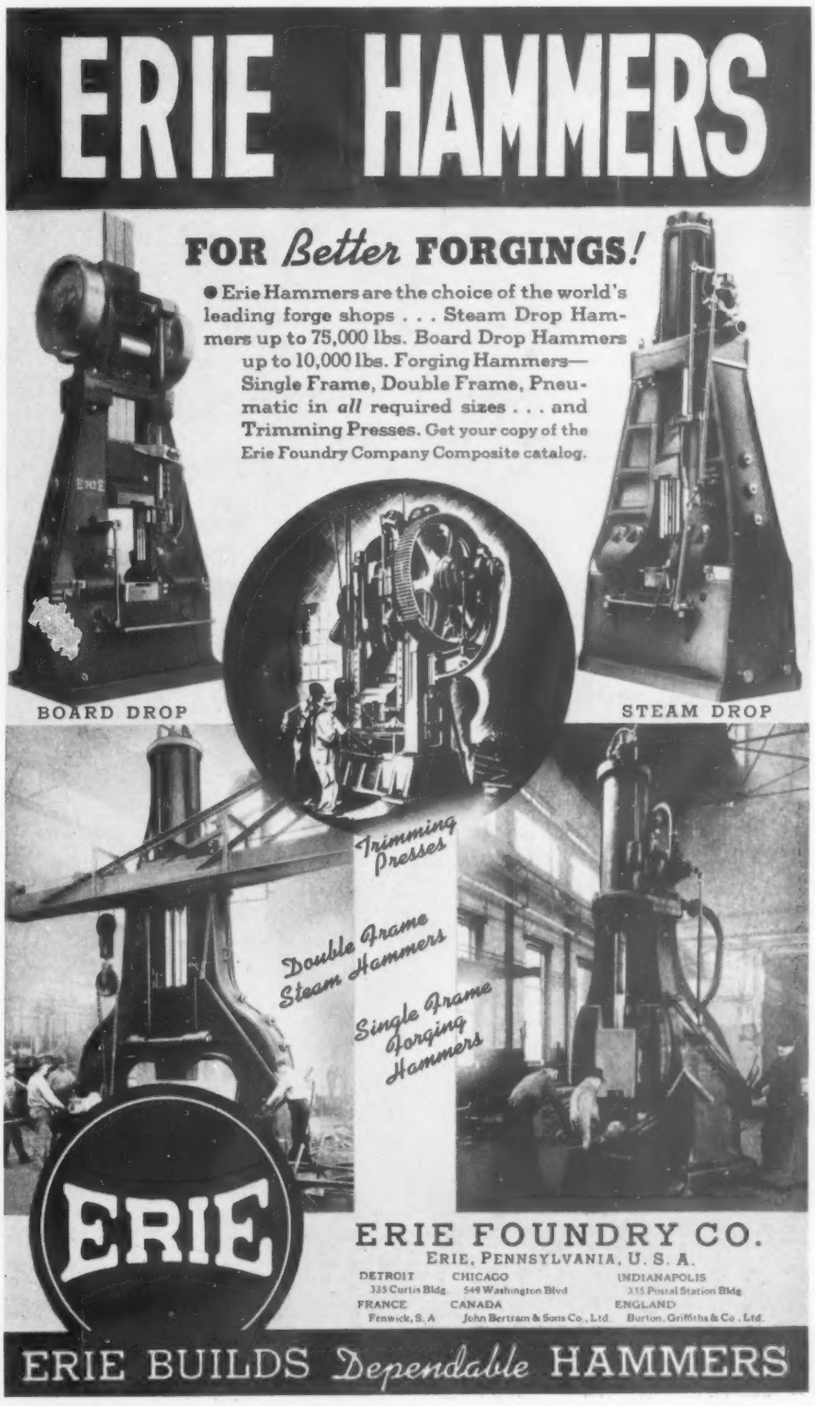
Philadelphia—Reinforcing bar inquiries are not large but are increasing in number. Private projects are more numerous and public building continues to take a good tonnage.

Seattle — Highway projects call for less than normal volume of reinforcing bars. Locally the market is slightly more active, tonnages as

Concrete Bars Compared

	Tons
Week ended June 15	**4,014**
Week ended June 8	**14,920**
Week ended June 1	**5,137**
This week, 1939	**8,837**
Weekly average, year, 1940	**8,159**
Weekly average, 1939	**9,197**
Weekly average, May	**7,058**
Total to date, 1939	**246,475**
Total to date, 1940	**195,824**

Includes awards of 100 tons or more.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FRANCE Fenwick, S. A.
CANADA John Bertram & Sons Co., Ltd.
ENGLAND Burton, Griffiths & Co., Ltd.
ERIE BUILDS Dependable HAMMERS

a rule being in small lots. Orders for merchant bars are fair, dealers restocking.

Toronto, Ont. — Demand for reinforcing steel has been steady. While no large awards were reported orders ranging from 50 to 300 tons have been fairly numerous.

Reinforcing Steel Awards

500 tons, addition, veterans administration facility, Sawtelle, Calif., to Soule Steel Co., Los Angeles.

400 tons, Cardinal Hayes memorial high school, New York, to Bethlehem Steel Co., Bethlehem Pa. through George A. Fuller Co., New York.

350 tons, subway, Chicago, section S-10-A, A. J. Forshner, contractor to Joseph T. Ryerson & Son Inc., Chicago.

350 tons, grade elimination, Westchester avenue, New York, for Triborough bridge authority to Fireproof Products Co., New York, through Del Balso Construction Co., New York.

341 tons, procurement division invitation 5665, North Kansas City, Mo., to Sheffield Steel Corp., Kansas City, Mo.

300 tons, shipway extension, Philadelphia navy yard, to Bethlehem Steel Co., Bethlehem, Pa., through Duffy Construction Co., New York.

250 tons shipway extension, Philadelphia navy yard, to Concrete Steel Co., New York, through Day & Zimmerman Co., Philadelphia.

250 tons, additional buildings, Celanese Corp. of America, Celco, Va., to Concrete Steel Co., New York; Virginia Engineering Co. Inc., Newport News, Va., general contractor.

208 tons, library, state college, San Jose, Calif., to San Jose Steel Co., San Jose, Calif.

198 tons, Kansas state highway bridges, to Sheffield Steel Corp., Kansas City, Mo.

175 tons, building for National Mutual Insurance Co., Hartford, Conn., to Bethlehem Steel Co., through George A. Fuller Co., New York.

175 tons, bar mats, highway project, Norfolk, Colebrook, Winchester, Conn., to Truscon Steel Co., Youngstown, O., through Oneglia & Gervasini, Torrington, Conn.

167 tons, state highway bridges, Pulaski county, Ark., to Jones & Laughlin Steel Corp., Pittsburgh.

125 tons, Washington state highway project, to Northwest Steel Rolling Mills Inc., Seattle; Goetz & Brennan, Seattle, general contractors.

125 tons, highway project, Fairfield, Conn., to American Steel & Wire Co., New York; New Haven Road Construction Co., New Haven, general contractor.

100 tons, bridges, route 29, Hillside and Union townships, New Jersey, to Jos. T. Ryerson & Son Inc., through New Jersey Asphalt & Paving Co., Jersey City, N. J.

Reinforcing Steel Pending

2200 tons, marginal wharf, naval supply depot, Oakland, Calif.; general contract to M. H. Golden, 534 Fourth street, San Francisco, at $613,000.

2000 tons, four store houses, naval supply depot, Oakland, Calif.; general contract to P. N. Severin, 222 West Adams street, Chicago, at $1,050,000.

1368 tons, viaduct, San Rafael, Marin county, Calif., for state; bids opened.

1000 tons, Brea dam, Orange county, California; general contract to Winston Bros., 411 West Fifth street, Los Angeles, at $664,401.

912 tons, reinforced concrete pipe, metropolitan water district, Los Angeles, specification 333; alternate bids on welded and cast iron pipe; bids June 25.

600 tons, flood control project, Corning, N. Y.; bids to United States engineer, June 21.

500 tons, machine shop expansion, navy yard, Portsmouth, N. H.

500 tons, office building, Heald Machine Co., Worcester, Mass.; E. J. Cross Co., Worcester, general contractor.

450 tons, underpass at Missouri Pacific tracks, Gravois avenue, St. Louis; G. L. Tarleton Co., St. Louis, general contract.

300 tons, two state bridges, Chelmsford-Lowell, Mass.

282 tons, railroad relocation, Coulee dam project; bids to Denver June 26.

235 tons, Coulee dam construction; bids to Denver June 12.

175 tons, highway project, East Hartford, Conn.; bids June 17, at Hartford, Conn.

160 tons, flood control project, Binghamton, N. Y.; bids to United States engineer, June 17.

150 tons, building, Charles Lenning Co., Philadelphia.

100 tons, building No. 18, Philadelphia navy yard; bids June 19.

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FROM ½ TO 1000 POUNDS

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DAMASCUS STEEL CASTING CO.
New Brighton, Pa.
(Pittsburgh District)

Pig Iron

Pig Iron Prices, Page 86

Pittsburgh—Pig iron sellers here report their books are in good shape with new business brisk and nearly all customers taking fairly good volume. Prices for the most part are firm at current quotations. Blast furnace activity is unchanged, with 38 of 42 stacks in blast. Merchant iron is moving freely.

Chicago — Buying has leveled off, most consumers having covered third quarter needs. Shipments of iron are improved over May and the gain apparently will be held through this month. Nonintegrated steel mills account for most heavier releases, as foundry operations continue about the same. Shipments of by-product foundry coke remain on a par with the rate of last month.

Boston—Pig iron buying tends upward, small-lot orders for prompt delivery being augmented by mild movement by some consumers to expand inventories. Shipments against orders are maintained generally and more tonnage for third quarter shipment is being booked. The Everett, Mass., furnace is expected to go into blast soon, probably ahead of first scheduled. Melt is improving with foundries supplying machine tool castings well booked ahead in most instances.

New York—Pig iron buying has receded from the recent bulge but specifications are expanding, indicating increased need for material. Many buyers find coverage thought sufficient for their needs is proving too small and further buying is likely to appear soon. Current specifications indicate June shipments will be well ahead of May and may attain the highest monthly total this year. Export demand has been affected by Italy's entry into the war as shipments to that and other Mediterranean countries will be cut off. Possibly as much as 35,000 tons may be affected.

Philadelphia—Pig iron orders are fairly numerous although not up to the volume of a fortnight ago. Movement this month is likely to be the best since early in the year. Foundry operations are improving but not as rapidly as steel mill production.

Buffalo — Wickwire Spencer Steel Co. has lighted an additional blast furnace, 11 of 13 in this district now producing. Some third quarter buying is being done, although books have not been formally opened.

Cincinnati—Shipments of pig iron, and other barometers, show the melt is almost steady at 60 per cent. Uncertainty of melters has yielded to belief activity will be sustained through the summer. Most third quarter pig iron needs are covered.

St. Louis—Shipments of pig iron have tapered somewhat since early June, following heavy forwardings in May. Melters have fairly well cleaned up supplies, and a considerable volume of inquiries is appearing, which it is thought by sellers will shortly result in actual placements.

Toronto, Ont.—Merchant pig iron sales are gaining as industry is speeded up to meet war demands. Daily melt now averages 82 per cent for all steel plants with prospects for early betterment. Sales for the week totaled upwards of 5000 tons. Inquiries indicate third quarter booking will run well above that of either of the two former quarters this year and it is stated that producers will open books for third quarter business within the next week or ten days.

Semifinished Steel

Semifinished Prices, Page 85

Pittsburgh — Semifinished orders continue to increase substantially,

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LUMNITE FOR REFRACTORY CONCRETE

Behind the Scenes with STEEL

How Do You Like It?

■ No longer is it an editor's dream, no longer is it "to be announced soon"—today Penton's Almanac, 1940-1941, is resting in preferred position on thousands of busy desks from the War office in Washington, to the machine tool plants in Connecticut and the airplane factories of California. And from every state in the country congratulations and compliments are piling up on desks here in Cleveland. We'll burden you with just one choice sample and that by C. V. Hale, president, Saginaw Sheet Metal Parts Corp. who says: *Penton's Almanac will be of great value to all in the industry. It is another proof that* STEEL *leads the way in serving and meeting the needs of its many readers. We thank you.* And we certainly thank you, Mr. Hale.

Not For Sale

■ Incidentally, we should like to repeat that copies of Penton's Almanac are available to regular subscribers only and are *not* for sale. One copy is included as an extra service on *each* subscription. We are being besieged with requests for additional copies but are sorry to say the supply is limited and the rule stands—"only one to a customer."

War Notes

■ Some day we'd like to meet Australian Censor S. 63 and get the real low down on a "renewal" we just received from a good subscriber from "down under". It began: *Enclosed find our draft* . . . but enclosed instead was a penciled note—*Sorry, there was no cheque or money order enclosed. Censor S.* 63. And not even any "love and kisses."

■ A G. M. executive, back in this country from his evacuated post in Germany, tells of a friend over there who ordered a baby buggy direct by mail last summer from a Nazi manufacturer. On arrival, it was broken down and there were no directions for assembling what appeared to be a rather complicated contraption. With a little help, though, it was finally put together but not as a baby buggy. Much to his surprise he found himself with a light machine gun!

■ Early last week a letter finally made its way from Oslo, Norway postmarked by the German postmaster of that city, carrying a special Nazi stamp, and inspected by the German censor. Just a little indication of German organization and efficiency—the letter was dated and mailed just a few days after the "protective" occupation.

Highspot

■ On page 18 this week there is quite an unusual advertisement. It is beautiful, simple and tells a forceful story. The story is this. A check-up of all the metalworking machinery in the Monarch plant revealed an average age of less than 7 years which contrasted sharply with the *American Machinist's* findings that over 70 per cent of all metalworking equipment in the country is over 10 years old.

Work With Music

■ Labor relationists and efficiency experts please note: The A. C. Gilbert Co. of New Haven has installed a radio system throughout the entire plant with a loud speaker outlet in every department, to bring ball scores, newscasts, music and talks by the management to employes. A master receiver is located in the telephone operator's room from which all programs are controlled. On the progressive assembly line floors, speakers are placed about every 30 feet and the girls assemble Gilbert products to swing music. The programs are turned on at 10:30 A. M. and again at 2:30. The biggest problem for the operator is to get a program that will please all 750 employes. Some of the older men would like to work to a Straus waltz while the younger element want to step out and "cut rug" to hot jitterbug tunes.

SHRDLU

with export activity increasing. Billets and rods account for most export business. Practically all domestic semifinished material is being released for immediate shipment, with the accent on sheet bars and slabs for nonintegrated mills. Skelp is moving at a good rate, particularly narrower widths for standard pipe.

Scrap

Scrap Prices, Page 38

Pittsburgh — Scrap prices are strong, with supplies light and inquiries heavy. Mills are actively trying to buy although the pressure has been less than in the Youngstown area. During this week, prices have been moving upward largely as a result of higher prices commanded by railroad lists closing last week. Led by No. 1 heavy melting steel, which was sold into consumption in this district at $20.50, most grades moved up from 50 cents to $2. Short sales are few.

Cleveland—An important steelmaker in this area has been negotiating for a large tonnage of steelmaking scrap and has closed on a total of 35,000 to 40,000 tons. Unconfirmed reports are that as high as $21 was paid for some of the tonnage. A Youngstown sale is said to have been made at $22, though not confirmed. Quotations have been advanced 50 cents to $1.

Chicago — Market strengthened notably last week, No. 1 heavy melting steel now being generally quoted at $18 to $18.50. Some speculative buying is going on, though chief causes of strength are covering on orders and general strength of the scrap situation over the country. Foundries are buying in good lots. Out-of-town transactions are quieter.

Boston — The upward swing in iron and steel scrap prices continues, several active grades advancing 50 cents a ton. For dock delivery, export, bids are stronger, better than $16 reported being done on No. 1 heavy melting steel. An Italian freighter here to load 7200 tons, halted operations after taking on 2000 tons following that nation's declaration of war, and will tie up at Boston.

New York — Shipments to eastern Pennsylvania steel mills are slightly heavier although volume of scrap moving from this district is not large. Foundries continue to buy conservatively. Prices have made additional advances for domestic shipment, although for export, with the exception of No. 2 heavy melting steel, quotations are

unchanged, with buying against boat loading dull. Report from Washington that the President might embargo shipments to all countries except the Allies under the Shepard-May bill, not yet passed, has not materially changed the situation. Action will await passage of bill and then depend on circumstances.

Philadelphia—Scrap prices are strong with several grades advanced. Buying is steady with no large purchases. Shipments to Italy have been stopped by its entry into the war, none of the 250,000-ton purchase being shipped, but some tonnage is moving to England.

Buffalo — The strong sentiment which has prevailed in the local scrap market for the last two weeks blossomed into a $1 price advance late yesterday as Bethlehem Steel Co. bought an unspecified tonnage of No. 1 heavy melting steel scrap, reported in some quarters to involve 50,000 tons, at $20 a ton. The previous range on this grade was nominally $18.50 to $19. Up to the time of this sale the market had been pretty much in the hands of dealers, with consumers taking only small lots.

Detroit—Quotations are up 25 cents to $1, with dealers paying well beyond mill buying prices. Some brokers still are cautious, but sentiment definitely favors the long side of the market.

Cincinnati—Iron and steel scrap prices are up sharply, 50 cents to $1.50. Dealers show more activity in bolstering stocks than do mills, although consumers are taking material steadily against near needs. June railroad lists are attracting much higher bids.

St. Louis—Prices have advanced 25 cents to $2.75 per ton, to increase shipments by country dealers, who have been holding back, causing shortage in some grades. An East Side mill has closed on a tonnage of specialties, the only important transaction recently. Melters and brokers are in a deadlock on prices.

San Francisco — Those in close touch with the situation are of the opinion that an embargo on scrap for export will be placed soon. In the Los Angeles and San Francisco districts no new orders have been placed so far this year. Pacific Coast open-hearth producers are paying $13 to $13.50 a net ton f.o.b. cars, metropolitan districts of Los Angeles and San Francisco for No. 1 heavy melting steel and $12 to $12.50 a net ton for No. 2.

Seattle—Shipments to Japan, all old commitments, have increased this week, as ocean space is easier, although freights are still $15 to $17. Export prices have firmed, due to higher levels in the East, No. 1 heavy melting being generally quoted at $16 with No. 2 at $14.50 and $15. Japan continues to place business but in small lots. Local mills are out of the market and foundry demand is nominal.

Toronto, Ont. — Firmer prices developed in iron and steel scrap, dealers raising prices on No. 1 and No. 2 heavy melting steel 25 cents per ton, now paying $11.25 and $10, respectively, delivered yards. Other items were unchanged, but dealers mostly offer top of the spread or slightly above for new supplies. Offerings have been improving and large tonnages are pouring in from holders and automobile wreckers in the Toronto area.

Warehouse

Warehouse Prices, Page 87

Pittsburgh — Warehouse stocks have increased considerably since the beginning of the current upward trend. Tonnage held by the jobbers has moved up as high as 30 per cent above holdings in the first quarter, in anticipation of increasing business.

Chicago — No definite upward trend is shown but business is encouraging. Sheets, bars, and small shapes are actively in demand. Warehouses are covering their own needs farther ahead, as mill deliveries on some products become extended.

Boston — Warehouse orders for

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alloy specialties are more numerous and in some instances dollar totals are up, but in the main tonnage being moved by jobbers about equals that of last month. Among the more active products are pipe, seamless tubing and alloy bars. Prices are firmer, although sheets, notably galvanized, are subject to spotty shading.

Philadelphia —Jobbing demand is expanding steadily with June business likely to exceed that of May. Prices generally are unchanged.

Buffalo—Warehouse sales are satisfactory and prices firm. Demand is stronger and current sales are at the highest rate for this year.

Cincinnati — Warehouse sales are well maintained. Some minor tonnages of building items have been closed but jobbers are not optimistic over prospects for large volume. Prices are firm and unchanged.

St. Louis — While reported spotty, both as to commodities and purchasers, the trend of warehouse business since the first of June is upward. General manufacturing demand has failed to show the usual seasonal contraction. Materials for railroad repair shops are moving in good volume.

Seattle—Labor difficulties are adversely affecting jobbing houses but they report fairly active demand, May showing a larger total than April. Prices are firm at pending low levels.

Iron Ore

Iron Ore Prices, Page 88

New York—Italy's entry into the war, closing the Mediterranean, has unsettled the foreign ore market and prices are nominal on manganiferous 45-55 per cent iron and 6-10 per cent manganese and on North African low phos and Spanish and North African basic. Low phos ore from the northwestern coast of Africa is not affected by the Mediterranean situation, however, but England is drawing more heavily on this ore and it is said little, if any, is available here.

Foreign manganese ore is also cut off by the Mediterranean blockade, shipments from Russia being stopped. Russia has been the chief source of this ore. Shipments from India have been going round the Cape of Good Hope for several weeks but little has come here as Great Britain has been taking most of this supply.

Some South African ore, manganese 50-52 per cent, has been offered here recently at 57 cents per unit, without duty. Availability of this source is uncertain. South American and Cuban manganese will be drawn on heavily, though the former is not of as high quality. The principal Cuban producer is getting 71 to 73 cents, duty free, for high grade ore, equivalent to about 60 to 62 cents on dutiable ore.

Ocean rates from South American and other ports are easier as more ships are being diverted from Mediterranean routes, increasing competition.

Steel in Europe

Foreign Steel Prices, Page 87

London—(*By Cable*)—The new Mediterranean situation affects the iron ore situation of Great Britain adversely but present stocks are adequate and further alternative supplies are available. By far the largest part of iron and steel output is required for war purposes, leaving only limited tonnages for domestic commercial use and for export. More American steel will be required than in the past. Tin plate export trade is fairly well maintained.

Ferroalloys

Ferroalloy Prices, Page 86

New York — Owing to the sharp advances in manganese ore, the market on standard ferromanganese has been advanced $20 a ton, to $120, duty paid, tidewater, effective June 15 on spot and July 1 on third quarter contracts. Various other manganese alloys also have been advanced, with silicomanganese up $15 per gross ton, low iron manganese $20, ferromanganese silicon $7, silicospiegel $10 and low phosphorus grade ferromanganese $25. Medium carbon ferromanganese has been advanced one cent per pound of alloy and low carbon ferromanganese one cent per pound of contained manganese.

Spiegeleisen has been increased $4 for the 19-21 per cent grade and $10 for the 26-28 per cent grade.

The silicon alloys have been increased $5 to $10 per ton, depending upon grade; zirconium alloy, 12 to 15 per cent, $5 and ferrosilicon briquets $5 per gross ton in car load and ton lots and a quarter of a cent per pound for briquets in less than ton lots. Silicomanganese briquets have been increased one-half cent per pound of briquets and a special graphitizing compound $15 per gross ton in car and ton lots and one cent per pound per compound in less than ton lots.

Indications point to no change in the chromium alloys, although

many in the trade looked for an increase in view of the strong market on chrome ore. Contract prices for third quarter had been reaffirmed on ferrovanadium, vanadium pentoxide and other vanadium metals, alloys and compounds; also on ferrotitanium, alsifer, grainal and V-foundry alloys. Spot prices are subject to change without notice.

In expectation of higher prices on contracts for third quarter, consumers of ferromanganese, silicomanganese and spiegeleisen in particular have been specifying freely this month. The movement will undoubtedly be the heaviest since last fall, in the opinion of leading trade interests.

Equipment

New York—Developments in the industrial field influenced by the proposed defense program and the likelihood of priorities on deliveries, have resulted in wide-spread efforts to get in machine tool orders for the earliest possible shipment. Deliveries are further extended and backlogs mounting despite high and in some instances 24-hour production schedules. Numerous industrial expansions in plant facilities call for much additional equipment, although where possible increased output tends toward additional and new machinery rather than shop additions. Nevertheless, increased shop space is required in most metalworking industries, notably aircraft, builders of the latter placing heavy additional orders for tools.

Boston—Substantial additional orders for machine tools are reaching New England shops from aircraft builders and heavy buying has developed in other directions. Some form of delivery priorities is expected from Washington in connection with the defense program and foreign orders. Most builders in this district have for weeks given domestic orders priority voluntarily. Government shop inquiry is heavier.

Philadelphia—Harnischfeger Corp., Milwaukee, has been awarded contract for bridge cranes, aircraft factory, Philadelphia, at $21,985.

Chicago — Orders in the past week were slightly less, but inquiries continue heavy. Renewed activity on the part of older inquiries also is reported. Though no definite trend upward in machinery and machine tools is seen here, the trade generally anticipates much heavier requirements in the near future.

Seattle—General business is improving with increased expenditure of federal funds and expansion of public projects. Tacoma has received bids for furnishing six

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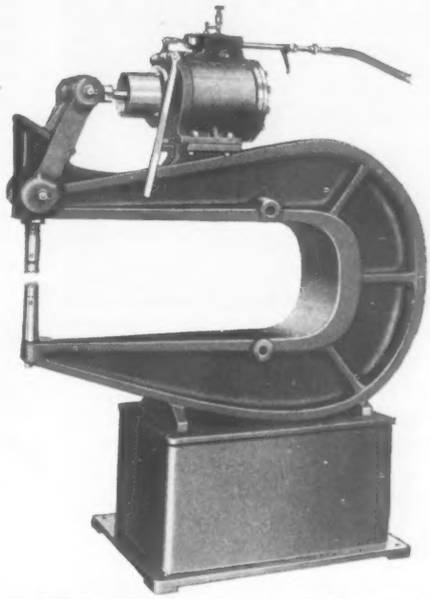
"ALLEN" STATIONARY PNEUMATIC JAW RIVETERS



This compact and powerful stationary pneumatic jaw riveter, mounted on a welded steel pedestal, allows very convenient handling of many kinds of production riveting work. Built in a full range of sizes, for squeeze riveting up to 1¼ in. hot structural rivets. Other Hannifin "Allen" pneumatic riveters available are portable jaw, compression lever, and alligator types, and hydraulic operated jaw riveter type.

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WRITES

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5000-kva transformers for Nisqually power house. Sam Bergesen, Tacoma, will furnish an incinerator for McChord Field, Wash. Bonneville Project, Portland, has called bids as follows: June 18, four 16,667-kva transformers for Vernita, Spec. 1077; June 18, construction of control house, appurtenances, intaking tower, etc., Chehalis, Wash. J. R. Ummel, government purchasing agent, Seattle, opened bids June 4 for seven gasoline-driven generating plants for bureau of Indian affairs. Eugene, Oreg., water board has awarded Westinghouse Electric & Mfg. Co. a contract at $175,890 for furnishing a turbogenerator, and condenser at $23,625; to C. C. Moore & Co. at $84,250, for Babcock & Wilcox boilers and equipment.

Nonferrous Metals

New York—Effects of the war became more apparent in nonferrous metal markets last week. Surplus supplies of producers were absorbed by consumers for both present and future requirements. Consumption has expanded so far this month, with galvanized sheet operations up to 56 per cent, copper and brass mill operations around 85 and tin plate production estimated at slightly over 76.

Copper—Sales continued heavy and by Thursday the June volume to date exceeded the total for all of May. With consumers well covered and the industry sold out through September, demand moderated. The producers' market continued 11.50c, Connecticut, with resale metal bringing as high as 11.75c, Valley, but later declining to 11.62½c.

Lead—Producers exceeded their intakes by a wide margin and some consumers found it difficult to obtain desired tonnages. The market held at 5.00c, New York, with a rise forestalled by competition of Mexican metal which could be delivered here at about 5.05c.

Zinc—Demand for high-grade metal has been heavy for some time, and offerings were scant all week. However, no move was made to lift prices above 6.25c, East St. Louis, for prime western. Loss of Belgian refining and fabricating facilities to the world market has been a factor in diverting substantial business to this country. Export sales of slab zinc brought up to 6.62½c, Texas Gulf ports.

Tin—Under the pressure of heavy dealer and consumer buying Straits spot rose to a high of 58.25c, equaling the 1939 high, with the exception of the elevated levels last September. No serious interruption to tin shipments from the East has developed so far.

Nonferrous Metal Prices

	Copper			Straits Tin, New York							
June	Electro, del. Conn.	Lake, del. Midwest	Casting, refinery	Spot	Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
8	11.50	11.50	11.30	54.37½	52.25	5.00	4.85	6.25	19.00	14.00	35.00
10	11.50	11.50	11.30	55.00	53.00	5.00	4.85	6.25	19.00	14.00	35.00
11	11.50	11.50	11.30	56.50	54.75	5.00	4.85	6.25	19.00	14.00	35.00
12	11.50	11.50	11.30	56.62½	55.25	5.00	4.85	6.25	19.00	14.00	35.00
13	11.50	11.50	11.30	58.00	56.12½	5.00	4.85	6.25	19.00	14.00	35.00
14	11.50	11.50	11.30	58.25	56.25	5.00	4.85	6.25	19.00	14.00	35.00

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F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 11.50c Conn. copper

Sheets

Yellow brass (high)	18.56
Copper, hot rolled	20.12
Lead, cut to jobbers	8.25
Zinc, 100 lb. base	11.50

Tubes

High yellow brass	21.31
Seamless copper	20.62

Rods

High yellow brass	13.55
Copper, hot rolled	16.62

Anodes

Copper, untrimmed	17.37

Wire

Yellow brass (high)	18.81

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	7.12½-7.37½
Cleveland	8.25-8.50
Chicago	7.50-7.75
St. Louis	7.75-8.25

Heavy Copper and Wire

New York, No. 1	8.75-9.00
Cleveland, No. 1	9.25-9.50
Chicago, No. 1	8.75-9.00
St. Louis	8.75-9.25

Composition Brass Turnings

New York	6.75-7.00

Light Copper

New York	6.75-7.00
Cleveland	7.00-7.25
Chicago	6.75-7.00
St. Louis	6.75-7.00

Light Brass

Cleveland	4.25-4.50
Chicago	4.37½-4.62½
St. Louis	4.25-4.50

Lead

New York	4.50-4.60
Cleveland	3.90-4.15
Chicago	3.90-4.10
St. Louis	4.00-4.25

Zinc

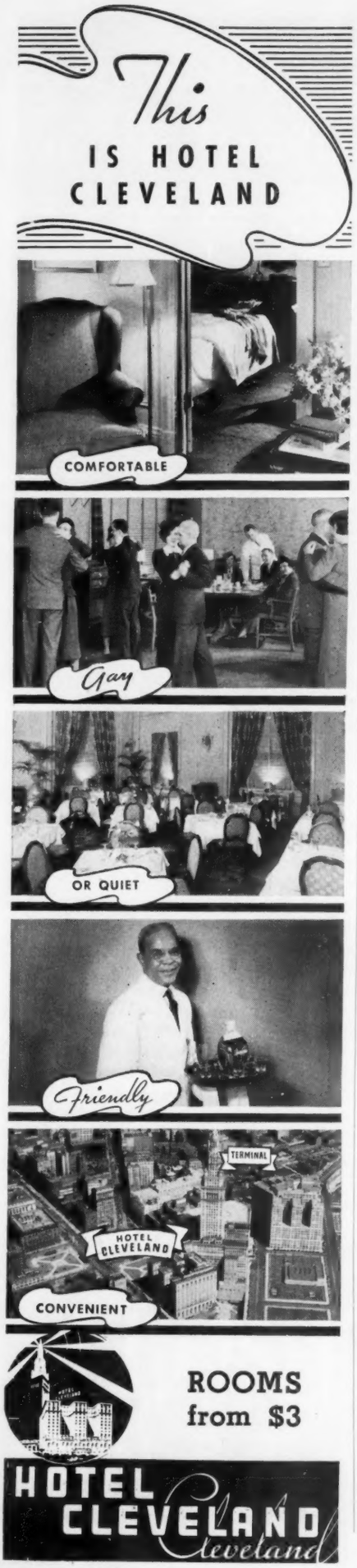
New York	3.50-3.75
Cleveland	2.75-3.00
St. Louis	3.25-3.50

Aluminum

Misc., cast, Cleveland	8.00
Borings, Cleveland	6.50
Clips, soft, Cleveland	14.00
Misc. cast, St. Louis	7.75-8.00

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads	12.25
Standard No. 12 aluminum	14.25-14.75



CONSTRUCTION and ENTERPRISE

Ohio

AMHERST, O.—Village, C. A. Cooper, mayor, will take bids soon on an electric light and power plant, 50 x 87 feet, with boiler room 35 feet high, engine room 25 feet high. Installation will include two 500-kw generators, two 300-horsepower boilers with stokers, ash-handling equipment and accessories. Cost about $145,000. Floyd G. Browne, Marion, O., is consulting engineer.

CALDWELL, O.—Village, S. D. Danford, mayor, takes bids to June 22 for a light plant addition to cost about $50,000. Carl J. Simon & Associates, Evans-Central building, Van Wert, O., are consulting engineers.

CLEVELAND — Kromer-Nierman Co., recently incorporated, R. G. Nierman of Motor Rim Mfg. Co., 1835 East Twenty-fourth street, manager, will establish plant in wing of Bellevue Mfg. Co. building, Bellevue, O. Thermostatic cooling equipment for beer will be manufactured.

CLEVELAND—J. M. & L. A. Osborn Co., A. W. Howe, president, 1541 East Thirty-eighth street, is having plans prepared by G. S. Rider Co., engineer, Terminal building, for a one-story factory and warehouse 110 x 132 feet, to cost about $50,000.

CLEVELAND—Boehm Pressed Steel Co., 2219 West Sixty-third street, will build a one-story brick and steel addition 50 x 110 feet for light machine shop and storage. Joseph J. Boehm is president and treasurer.

DAYTON, O.—Aeroproducts division, General Motors Corp., 288 East First street, plans erection of a large plant in vicinity of Dayton for manufacture of airplane propellers, to cost about $1,000,000.

MANSFIELD, O.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has given general contract to Rust Engineering Co., Clark building, Pittsburgh, for plant additions here. (Noted June 3).

SPRINGFIELD, O.—International Harvester Co., Lagonda avenue, has let general contract to A. G. Samuelson, Springfield, for one-story 100 x 200-foot addition to building No. 9, to cost about $40,000.

WARREN, O.—Mullins Mfg. Co. has given contract to W. B. Gibson Co., 238 Chestnut street, Warren, O., for a furnace building and additions. Porcelain enameling furnace will be supplied by Ferro Enamel Corp., 4150 East Fifty-sixth street, Cleveland.

Connecticut

BRIDGEPORT, CONN.—Bullard Co., 286 Canfield avenue, E. P. Bullard, president, will build a one-story foundry addition 90 x 360 feet. General contract to Turner Construction Co., 420 Lexington avenue, New York. Cost estimated at $40,000.

BRIDGEPORT, CONN.—New England Ice Co., 224 Hallam street, will build a one-story ice plant 100 x 300 feet on Knowlton street to cost about $70,000. Keith S. Heine, 101 Mohawk drive, Bridgeport, is architect.

EAST HARTFORD, CONN. — United Aircraft Corp., Pratt & Whitney division, has let contract to Turner Construction Co., Boston, for two one-story additions to plant. Albert Kahn Inc., Detroit, is engineer. Plant will be completed in three months.

TURNINGS ARE MORE EXPENSIVE THAN THE STEEL FROM WHICH THEY COME!

. . . not in scrap value, of course, but in their cost of manufacture . . . *But*, you say, we don't *intend* to manufacture turnings! Yet, you do if you attempt to economize by making ring dies, bushings, forming rolls, etc., from solid steel.

With a complete stock of BISCO alloy and tool steel tubing on hand—and with both local and distant deliveries so modernly dependable, it becomes more economical to select your exact requirements from the BISSETT line of tubing and also secure the exact size needed in both inside and outside diameters nearest your individual requirements . . . In addition to BISCO *Non-shrink, oil-hardening* tool steel tubing, we furnish from stock stainless steels, alloy steels, etc. A copy of our stock list will be mailed promptly upon request.

THE BISSETT STEEL CO.

900 EAST 67th STREET, CLEVELAND, OHIO

NEW BRITAIN, CONN.—New Britain Machine Co., 140 Chestnut street, has let general contract to Morton C. Tuttle Co., 862 Park Square building, Boston, for a one-story plant addition. (Noted June 10).

Massachusetts

GARDNER, MASS.—Florence Stove Co. has let general contract to Donald D. Snyder Inc., 36 Conee street, for a two-story factory addition costing about $40,000. (Noted June 3).

SOMERSET, MASS.—Montaup Electric Co., Fall River, Mass., has retained Stone & Webster Engineering Corp., 49 Federal street, Boston, to design an addition to its steam-electric generating plant, including turbine-generator units, high-pressure boilers and auxiliaries. Cost about $3,000,000.

New Hampshire

NORTH HAMPTON, N. H.—G. Dow, chairman, board of selectmen, town hall, is preparing plans for water supply, including elevated steel tank and watermains, pump etc. at cost of about $75,000. Whitman & Howard, 89 Broad street, Boston, are engineers.

Pennsylvania

JENKINTOWN, PA.—Standard Pressed Steel Co., has let general contract to Townsend, Schroeder & Wood, Sansom street, Philadelphia, for a one-story plant addition 75 x 150 feet, costing $40,000.

LATROBE, PA. — Latrobe Foundry, Machine & Supply Co., L. C. Steiner, manager, Cooperstown road, has let general contract to A. Iorio, 1415 Ligonier street, for a foundry addition 80 x 88 feet.

PHILADELPHIA—SKF Industries Inc. has bought the plant of the John Warren Watson Co., Bridge street and Pennsylvania railroad, 226,000 square feet, to expand its capacity.

Michigan

DETROIT—Industrial Smelting Co., 648 East Columbia avenue, has been incorporated with $50,000 capital to deal in ores and metals, by J. M. Marx, 2041 Atkinson avenue, Detroit.

DETROIT—Detroit Gasket & Mfg. Co. is having plans drawn by H. D. Ilgenfritz for a warehouse building 100 x 730 feet on Burt road.

DETROIT—American Metal Products Co. has awarded general contract to Bryant & Detwiler Co., Detroit, for a plant addition. Giffels & Vallet Inc. is engineer.

JACKSON, MICH.—Jackson Forge & Machine Co., 1838 Cooper street, has been incorporated with $100,000 capital to conduct a forging, foundry and machine shop business, by Charles T. Cline, R.F.D. No. 1, Rives Junction, Mich.

JACKSON, MICH.—John Crowley Boiler Works is having plans made by Frost & Snyder, Jackson, architects, for a plant addition.

KALAMAZOO, MICH.—Ingersoll Steel & Disc division of Borg-Warner Corp. has given contract to Miller-Davis Co., Kalamazoo, for a plant addition.

Illinois

CHICAGO—Chicago Smelting & Refining Corp., Elmer E. Fisher, secretary, 2547 South Loomis street, is having plans drawn for a foundry addition 60 x 275 feet, at Kedzie avenue and Thirty-seventh street. Aetna Engineering Works, 12001 South Calumet avenue, Chicago, engineer.

CHICAGO — Sterling Concrete Vault Co., 2460 Irving Park road, will build a one-story plant 100 x 178 feet at 5400 Northwest highway. E. B. Reiner, 2553 Logan boulevard, is architect. General contract to G. Kehl & Sons, 1225 North Maplewood avenue. Cost about $50,000.

EAST MOLINE, ILL.—Deere & Co., manufacturers of agricultural machinery, has let general contract to Axel Carlson Co., Moline, Ill., for additions to steel storage buildings 50 x 50 and 100 x 120 feet.

PEORIA, ILL.—F. Meyer & Bros. Co., manufacturer of furnace pipe, damaged seriously by fire.

ROCK ISLAND, ILL.—Birtman Electric Co., First street and Fourteenth avenue, will build additions to plant, including plating room, punch press department, machine shop, foundry and warehouse. Design and construction by The Austin Co., 16112 Euclid avenue, Cleveland. Cost about $100,000.

Indiana

ANDERSON, IND.—Guide Lamp division, General Motors Corp., Twenty-sixth street, will build a one-story addition 100 x 200 feet, to its automobile lamp manufacturing plant. Total cost estimated at $150,000.

EVANSVILLE, IND.—Sunbeam Electric Mfg. Co., Morgan avenue, will build a two and three-story plant 89 x 142 feet. E. C. Berndes, 121 Upper Fourth street, is architect.

CHAIRS SMARTLY STYLED IN STEEL

Modern Office Chairs—Built to Endure

Harter Steel Chairs, for fine offices, are noteworthy for their ease and comfort—for their modern flowing lines and for their sturdiness.

Chairs in the Columbian Suite, illustrated above, are equipped with moulded form rubber cushions. This is in line with the latest trend, for wherever comfort is of paramount importance in seating, there you will now find foam rubber in use.

More and more business leaders are turning to Harter. They know that in so doing they will get smartly styled steel chairs—chairs that offer the last word in comfort plus extra long wear.

These business leaders also know that Harter Posture Chairs are outstanding in the posture chair field. Harter Posture Chairs are designed to make good sitting posture easy and natural. There is a Harter chair for every type of seated work. The Harter Corporation, Sturgis, Michigan.

HARTER

OUR AIM is to render service. A little more complete . . . more hospitable . . . more pleasing . . . than even the most exacting guest expects.

CHAS. H. LOTT
Manager

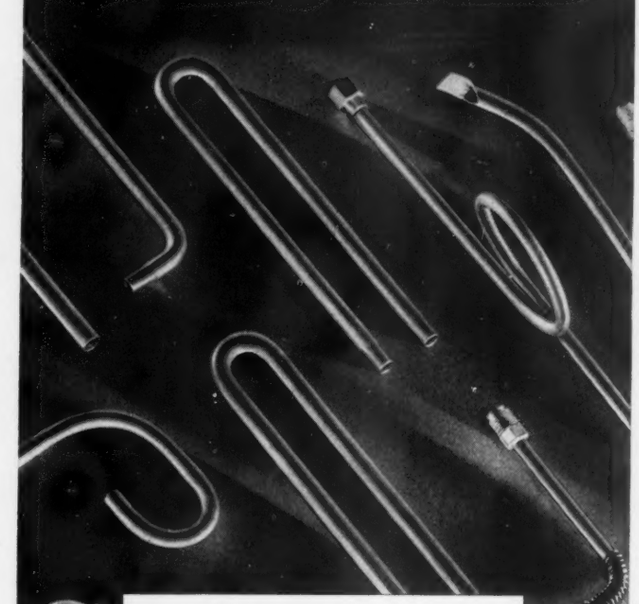
Every Room Outside with Private Bath

Single from $2.50
Double from $4.00

DETROIT LELAND HOTEL

CASS AT BAGLEY AVE.
GARAGE IN CONNECTION

"Tubing Headquarters" Is Also Headquarters For Tubing *Fabrication*



● Bundy is not only one of the world's largest manufacturers of tubing, but also probably the *largest fabricator of tubing parts*. Through our years of experience we have developed highly specialized methods and equipment which enable us to furnish completely fabricated tubing units, at LESS than they would cost if fabricated in your own plant!

In addition to low cost, Bundy fabrication provides many points of superior quality: maintenance of diameter at bends; accurate radii and angles; uniformity of flare insured by Bundy's exclusive "two-operation" flaring process; rigid control of materials, and many others.

Perhaps you can use these fabricating facilities to advantage. Bundy's Engineering Department will welcome the opportunity to co-operate in solving your tubing problems.

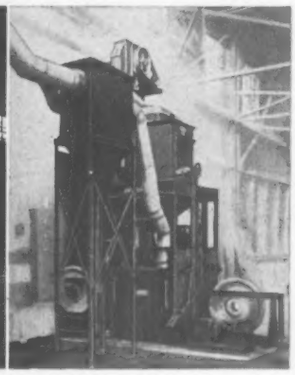
BUNDY TUBING COMPANY • DETROIT

BUNDY TUBING

PANGBORN

"THERE IS NO SHORT-CUT TO EXPERIENCE"

ROCKER BARREL

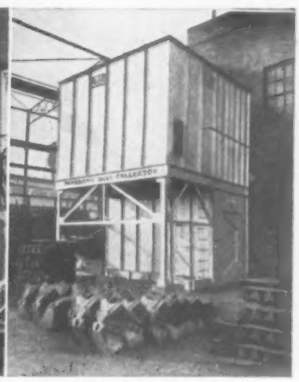


SPECIAL MACHINE

ROTOBLASTING

Pangborn ROTOBLAST Barrels, Tables and Cabinets are producing cleaning room economies of major importance. Why? Because "there is no short-cut to experience like Pangborn's" . . . 35 continuous years of exclusive service designing, building and servicing BETTER and BETTER Blast Cleaning Equipment. Specify ROTOBLAST.

AUXILIARY TABLE



DUST COLLECTOR

DUST COLLECTING

The Pangborn all-steel, cloth screen Dust Collectors are paying BIG DIVIDENDS daily to owners of more than 4600 installations. The improved rapping mechanism, the wire-lined cloth screens, the "quick-seal" used to hold screens to grid partition are but three of the fourteen outstanding features found in Pangborn Collectors. Write for Bulletin No. 197.

PANGBORN

WORLD'S LARGEST MANUFACTURER OF BLAST CLEANING AND DUST CONTROL EQUIPMENT

PANGBORN CORPORATION • HAGERSTOWN, MD.

KENDALLVILLE, IND.—Board of public works, R. C. Moses, secretary, is making a survey for extensions and improvements to municipal power plant and waterworks at cost of about $75,000, including new boiler units and other equipment.

RENSSELAER, IND.—Beau Nite Inc. has been incorporated with 1000 shares no par value to conduct a foundry and milling business. Schuyler C. Irwin, Rensselaer, is agent.

District of Columbia

WASHINGTON — Bureau of supplies and accounts, navy department will receive bids as follows: June 18, schedule 1983, motor-driven ram-type milling machine and spare parts for Philadelphia; schedule 1968, motor-driven propeller profiling machine for Philadelphia; schedule 1970, motor-driven light duty engine lathe for San Diego, Calif.; schedule 1892, motor-driven bench milling machine for Camden, N. J.; schedule 1936, three core and mold ovens for Portsmouth, N. H.; June 21, schedule 1902, motor-driven turret lathe for Pacific coast delivery; schedule 1947, motor-driven toolroom engine lathe for Camden, N. J.; schedule 1948, four motor-driven screwcutting bench lathes for Camden, N. J.; schedule 1954, motor-driven toolroom engine lathe for Camden, N. J.; schedule 1960, three motor-driven plain bench milling machines for Camden, N. J.; schedule 1898, motor-driven initial pinch type bending roll for Pacific coast points; schedule 1903, motor-driven self-contained cylindrical grinder for Mare Island, Calif.; June 25, schedule 1952, motor-driven duplex type universal miller for Alameda, Calif.; schedule 1944, motor-driven bench precision lathe for Alameda, Calif.; schedule 1943, motor-driven general purpose lathe for Alameda, Calif.

NF

BASIC ELECTRIC STEEL

FORGINGS

N.F.& O. Basic Electric Steel produced under rigid metallurgical control is an important *quality* factor in the ultimate forged product

BASIC ELECTRIC STEEL

Carbon, Alloy, Corrosion Resistant and Special Steels Smooth Forged, Hollow Bored, Rough or Finished Machined, Heat Treated to Specifications ...Forging Quality Ingots, Pressed or Hammered Billets.

Die Blocks & Piston Rods

NATIONAL FORGE AND ORDNANCE COMPANY

IRVINE, WARREN COUNTY, PENNA.

Wisconsin

ABLEMAN, WIS.—Village, Paul Bittrick, clerk, plans construction of a municipal waterworks system, including steel tank and tower, pumping station and equipment and distributing system, to cost about $83,000. General Engineering Co., Portage, Wis., is engineer.

BARABOO, WIS.—Northwestern Refrigerator Car Co. will build a one-story car shop addition 65 x 308 feet. Frank Riley and Lewis Siberz, Madison, Wis., are architects.

MILWAUKEE — Allen-Bradley Co., manufacturer of electric controlling devices and similar products, will build a four-story plant addition 90 x 126 feet, on West Greenfield avenue. Fitzhugh Scott, 724 East Mason street, is architect.

OSHKOSH, WIS.—Winnebago county, Arthur D. Hedtke, clerk, has given general contract to W. C. Smith Inc., Duluth, for a two-story maintenance and shop building 80 x 105 feet. Sandstedt & Knoop, Oshkosh, are architects.

Texas

HOUSTON, TEX.—B. A. Reisner & Son Co., 14 Travis street, has bought site and will build steel fabricating shop.

South Dakota

BISMARCK, S. DAK.—Dakota Public Service Co., A. B. Sanborn, president, will build power plant addition 50 x 80 feet to house new 5000-KVA turbogenerator and other equipment, at total cost of $400,000, with equipment. Sargent & Lundy Inc., 140 South Dearborn street, Chicago, are engineers.

PIERRE, S. DAK.—H. H. Clark, Manville, Wyo., has started preliminary work on an oil refinery at Pierre, to include three stills and towers for daily capacity of 360 barrels of crude oil.

Iowa

CEDAR RAPIDS, IOWA—Hubbard Ice & Fuel Co., 1124 First street N. W., plans to erect a four-story cold storage and refrigerating plant 60 x 150 feet, to cost about $90,000 with equipment.

WEST BEND, IOWA—Alex Pertl, town clerk, will open bids June 27 for a diesel generator unit for the municipal light and power plant. A. S. Harrington, 501 Baum building, Omaha, Nebr., is consulting engineer.

Wyoming

NEWCASTLE, WYO.—Public service commission has granted permit to Jack Ware & Associates, Manville, Wyo., to build a 62-mile crude oil pipe line from the Lance Creek oil field to Newcastle, to cost about $125,000.

Montana

BILLINGS, MONT.—Paris & Seitz Machinery Co. will build a one-story warehouse and shop 40 x 80 feet on North Twenty-fourth street.

California

LOS ANGELES—Los Angeles Aircraft Corp. has been incorporated with $25,000 capital by F. J. Buckley, C. P. Shattuck and N. Kinney, Los Angeles.

SOUTH GATE, CALIF.—DeLong Engineering Works, 8653 Atlantic boulevard, has been incorporated by Walter I. DeLong, South Gate.

Washington

ABERDEEN, WASH.—American Plywood Co., recently organized with $500,000 capital will build plant with 117,000 square feet floor space, replacing plant of Aberdeen Plywood Co., recently burned. V. A. Nyman is general manager. General contract to Grays Harbor Construction Co. (Noted May 6.)

GOLDENDALE, WASH.—Special election will be held July 2 on $75,000 bond issue to finance construction of disposal plant, for which WPA allocation of $50,000 is expected.

GRAND COULEE, WASH.—Washington Prospectors' and Miners' association, A. A. Elmore, president, plans formation of a corporation, with $250,000 capital to build a mill and smelter above Coulee dam. Mining executives from Washington and Idaho will meet here June 21-22 to discuss project.

YAKIMA, WASH. — General contract for J. M. Perry memorial trade school has been awarded to Howard S. Wright, Seattle, at $267,913. Includes shops, boiler and power plant and other structures for which equipment will be required.

Canada

HAMILTON, ONT.—Dominion Foundries & Steel Ltd. has started work on an additional aisle in the annealing unit. Construction is now under way to add three bays to the cold-rolling mill unit.

NORTH YORK TOWNSHIP, ONT.—De Haviland Aircraft of Canada Ltd., with co-operation of department of munitions and supply, Ottawa, Ont., has awarded contract for first unit of its expansion to A. W. Robertson Ltd., Toronto, Ont. Edgar A. Cross, 991 Bay street, Toronto, is mechanical engineer.

WINNIPEG, MAN.—Building Products Ltd. will build paper mill to cost about $250,000. Construction will be started in the fall.

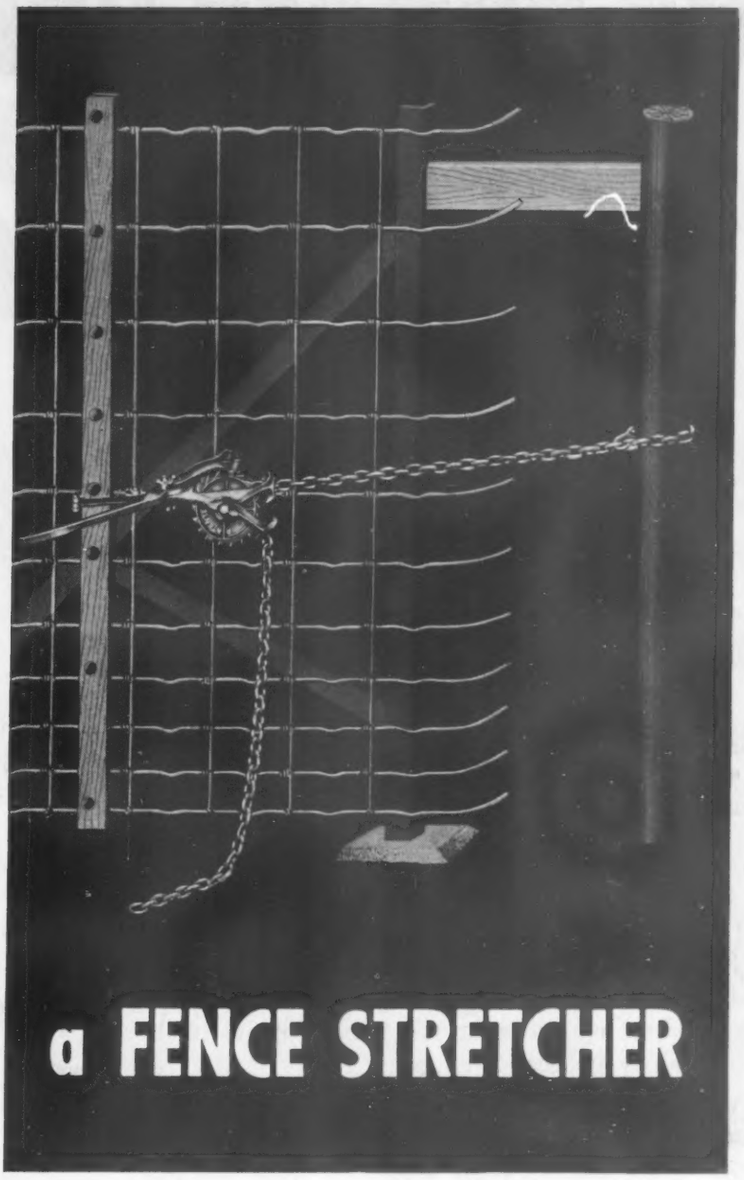
ASBESTOS, QUE.—Canadian Johns-Manville Co. Ltd. will build two additions to its plant here, steel and concrete.

LAUZON, QUE.—Davie Shipbuilding & Repairing Co. Ltd., 25 David street, has let general contract to Komo Construction Co. Ltd., 812 St. Vallier street, Quebec, Que., for a mould loft costing $40,000. Hutchison & Wood, 204 Notre Dame street West, Montreal, are architects.

THURSO, QUE.—Singer Sewing Machine Co., 195 Sparks street, Ottawa, Ont., has let general contract to A. F. Byers & Co. Ltd., 1226 University avenue, Montreal, for a plant addition to cost $60,000.

YES...

there really is a FENCE STRETCHER



Bethlehem does not confuse fence-stretchers with the legendary pie-stretchers and left-hand monkey wrenches. We know they exist because we annually furnish a sizable tonnage of steel for the manufacture of these useful tools.

In fact, it is difficult to think of any product made of steel for which Bethlehem has not supplied material and sound advice. Of course, practically all such products use one of a hundred or more standard analyses of steel, produced under one of a dozen or more standard practices. That, however, is not the story. The trick is to know which anlysis and which practice should be used.

Bethlehem knows a good deal about the application of steel to the most specialized problems. If you will put your problems up to us, we can often show how a change in steel, its fabrication or treatment, will give you a better product for the same money or as good a product for less money.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

"OUR NUMBER ONE SALESMAN Doesn't Carry a Briefcase!"

"Here's a Tip! Get Texrope-Driven Machines. You'll Get More Business . . . and Profits, Too!"

"WE'RE AFTER extra business . . . and we're getting it! Though there was a time when jobs were few and far between. And when we did get one . . . obsolete equipment we had ate up profits so fast, it was just as likely we'd lose money as break even.

"So we cleaned house . . . threw out the old machines and installed new Texrope-driven ones.

"There was a change right away . . . once we did away with all the overhead shafting and long center belts that blocked out the light. Seemed that our workers were as cheerful and bright looking as the sunlight that streamed in the windows and flooded the shop.

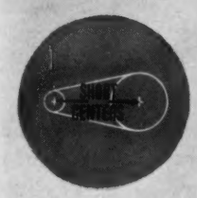
"Those cool-running, silent Texrope Drives really made a hit with them . . . after having had to work around slapping belts and screeching pulleys. And they made a hit with our salesmen, too! They're able to quote on jobs they never had a chance on before. What's more . . . they're getting them.

"No wonder we call those machines our number one salesman! They're keeping our production costs down . . . they're protecting our profit margins . . . they're bringing us new orders!"

If you are looking for the more efficient operation that means lower costs and more profits . . . you'll want to know the story of why Texrope Drives have skyrocketed to first place as the most popular way to drive machines.

Call the nearest Allis-Chalmers district office or dealer for the complete facts on how you can save money in your plant . . . with genuine Texrope Drives. Texrope Drive Division, Allis-Chalmers Mfg. Company, Milwaukee, Wisconsin.

See How These Texrope Features Save You Money!



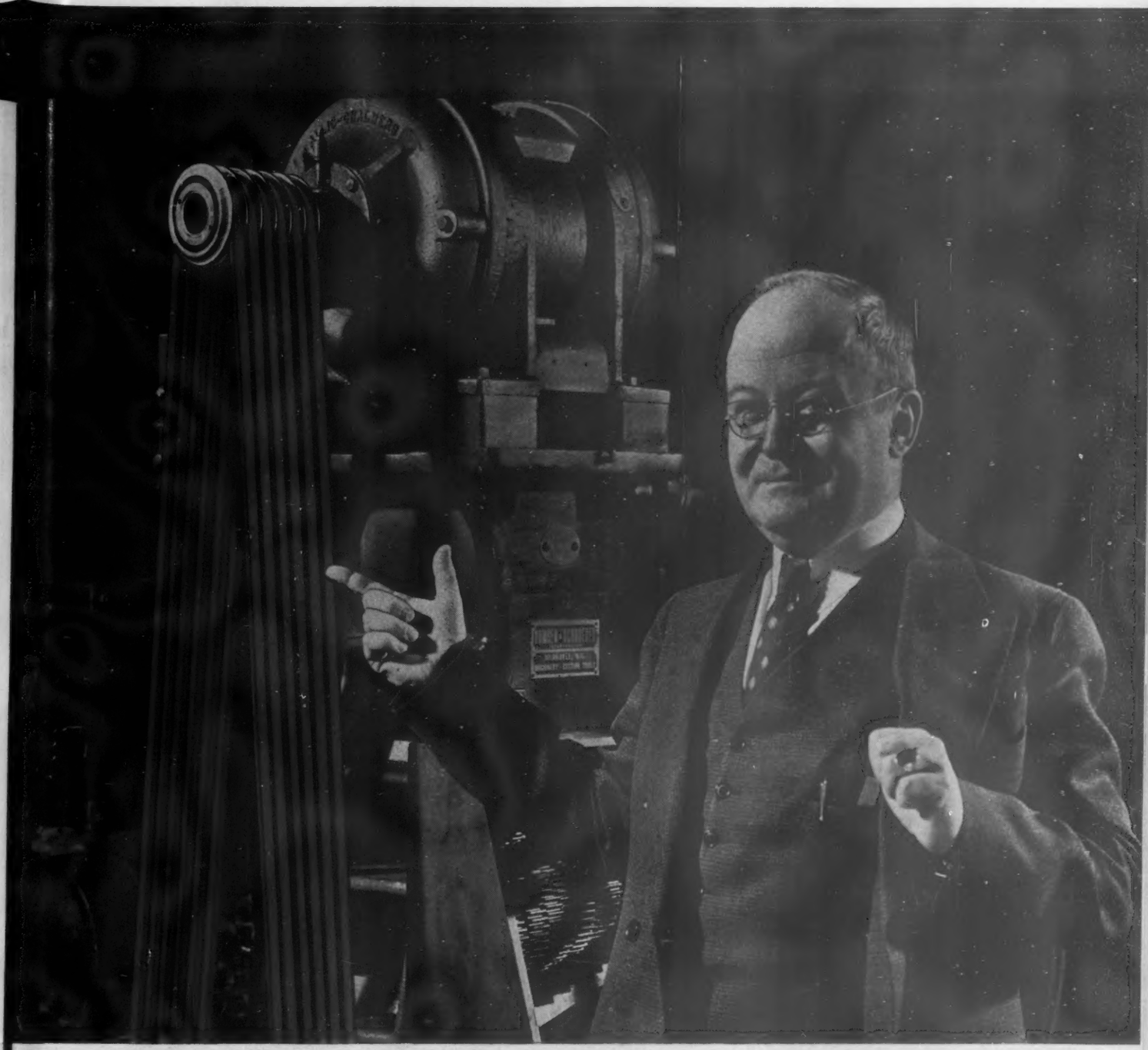
SHORT CENTERS FOR SPACE SAVING. Texrope V-Belt Drives allow you to put your source of power close to the machine being driven. There's no waste space . . . no unsightly shafts to keep out light.

INDIVIDUAL DRIVE PRINCIPLE CUTS POWER COSTS. When each machine has its own drive, you only pay for power costs when it is producing. In contrast . . . where a group of machines is coupled to a line-shaft . . . only one might be running . . . but power used is out of proportion to actual needs.

A 1237

Belts by Goodrich

TEXROPE DRIVES CUT



SAFETY . . . EASILY AND ECONOMICALLY GUARDED. You eliminate danger spots when you install Texrope Drives. Because of their short centers, it's easy to slip a small, inexpensive guard over them.

FLEXIBILITY OF LAYOUT . . . EASY TO INSTALL. You don't have to change over machines or existing layouts to fit Texrope V-Belt Drives. They'll operate in practically any position without losing their efficiency . . . and they're easy to install.

SHOCK-PROOF FEATURE PROTECTS MOTOR AND MACHINE. Texrope Drives do not vibrate . . . actually absorb shocks even when the load is a pulsating one. Lower belt pull means longer bearing life . . . less service and maintenance costs.

EFFICIENCY HIGH . . . MAINTENANCE LOW. With Texrope Drives, transmission losses from motor to machine are cut to a minimum. There's no belt slip . . . no unnecessary wear and tear on belts . . . no need for belt dressing.

★ **ADEQUATE STOCKS ARE CARRIED THROUGHOUT U. S. A.**

Get Texrope Drives and replacements instantly from Allis-Chalmers warehouses and dealer stocks in all parts of the country.

TRANSMISSION COSTS

Reader COMMENTS

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Standards Strengthen Industry

To the Editor:

I agree most heartily with the suggestions on simplification, as set forth in the editorial in STEEL, June 10, page 40. As one who has been active in national standardization work, especially in the gage field, I know that savings and efficiency can be effected by this procedure.

I think you will find that the major opposition will come from those who fear loss of identity through standardization of their products. Many of us gage makers felt the same way at first, but I can say without fear of contradiction that this has not been the case, and that the advent of standardization has strengthened rather than weakened the industry as a whole. I hope you put your ideas across.

FREDERICK S. BLACKALL JR.
President and treasurer,
Taft-Peirce Mfg. Co.,
Woonsocket, R. I.

Would Hasten Deliveries

To the Editor:

Steel simplification (STEEL, June 10, p. 40) is a real problem, not only to steel producers but to those of us who are called upon to quote on and make articles to customers' specifications.

In this editorial you have approached the problem from the standpoint of the advantages which would accrue to the steel producers through simplification, but I would like to suggest that you follow this up with others in which you stress more definitely the advantages to the user.

It is true that cost would be an incentive but in many cases the difference in material cost would be such a small part of the total cost of the finished article that there would still remain a strong reluctance to change from a special or rare analysis to one of the selected group on the basis of cost alone. However, delivery has always been important and it is now vital. I believe that if the user could be convinced that by this simplification he could get his orders filled much more rapidly, we would find him much more willing to co-operate.

We are much concerned with this problem.

ARTHUR E. FOCKE
Research Metallurgist,
Diamond Chain & Mfg. Co.,
Indianapolis

Can See no Hardship

To the Editor:

I have read your editorial on simplification in steels, (STEEL, June 10, p. 40) with interest. From the standpoint of the user I don't believe there would be any hardship in being limited to a list of 200 significant steels. In fact, I am not sure but that the machine tool industry could get along with a very small fraction of that number and still meet all requirements.

I am heartily in favor of simplification and standardization to as great an extent as is possible without unduly hampering designs.

HENRY K. SPENCER
Manager,
Blanchard Machine Co.,
Cambridge, Mass.

Is in Full Accord

To the Editor:

I am entirely in accord with the editorial, "Simplification Is Needed." (STEEL, June 10, p. 40). If standards were set up they could be put over with the trade and the job would be greatly simplified for manufacturers.

A. E. GIBSON
President,
Wellman Engineering Co.,
Cleveland

Finds STEEL Great Help

To the Editor:

I find STEEL a great help in my economic and business studies.

HUMPHREY B. NEILL
"Contrary Opinionist,"
126 Liberty street,
New York

Schaefer on Pension Plans

To the Editor:

I have read the article entitled "What Price Old Age", (STEEL, May 13, p. 21) with much interest and think that, in general, it is a good presentation of the subject of private pension plans. This subject is, however, very broad in scope and it is very difficult to enunciate, in a brief article, principles and objectives which apply in the same way to the varying conditions to be met by different industries. One of the principal purposes outlined in Mr. Klein's article, to the effect that a well conceived and properly prepared industrial pension plan should be established fundamentally on the basis that it is good business as a means for meeting the superannuation problem, is, in my opinion, an entirely correct approach to the subject. There are, of course, very obvious social and humanitarian aspects to well designed private pension plans but, as pointed out in the

(*Please turn to Page* 74)

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SECOND GUESSES ARE OUT... WHEN MILLING PARTS LIKE THIS

• Large intricate castings like the one shown above—a stainless steel intake valve for a vacuum packing machine—really bring out the versatility, accuracy, and maneuverability of a machine tool. Take the milling operations, for example. One little slip and hundreds of dollars worth of material and workmanship are wasted.

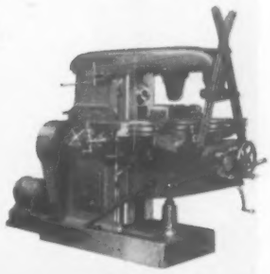
At the time the picture was taken, the operator was boring the pockets with a special milling cutter on a CINCINNATI No. 4 High Power Miller equipped with a Heavy Duty Vertical Attachment. Accuracy of these pockets must be right on the nose, or the vacuumizing process in the vacuum packing machine will be faulty, and profits will leak away rapidly.

No doubt the convenient controls which enable the operator to maneuver the work under the cutter had a lot to do with the selection of a CINCINNATI for such jobs. And then there's the inherent accuracy which means so much; the ability to take heavy cuts; rear controls for the jobs which hide the cutter; and many other profitable factors.

Write for catalog M-582 and get the whole story.

CINCINNATI

A SYMBOL OF A DEFINITE STANDARD OF WORTH



THE CINCINNATI MILLING MACHINE CO.

Cincinnati, Ohio, U. S. A.

THREE HEADS

are better than One!

● *It's no one-man job* to cut production costs, improve the product, and increase furnace efficiency in heat treating shop, steel plant, or forge.

In fact, it's a three "man" job...involving your Plant Engineers, the Furnace Builders and the Refractory Manufacturer. And here's why we include ourselves in this picture:

More than 20,000 experimental refractory mixes have been examined and tested by our Research and Development Departments. As a result of this development program The Carborundum Company has made available sixty different standard varieties of silicon carbide refractories, twenty varieties of aluminum oxide refractories, and many different types of mullite, insulating and fused cast refractories.

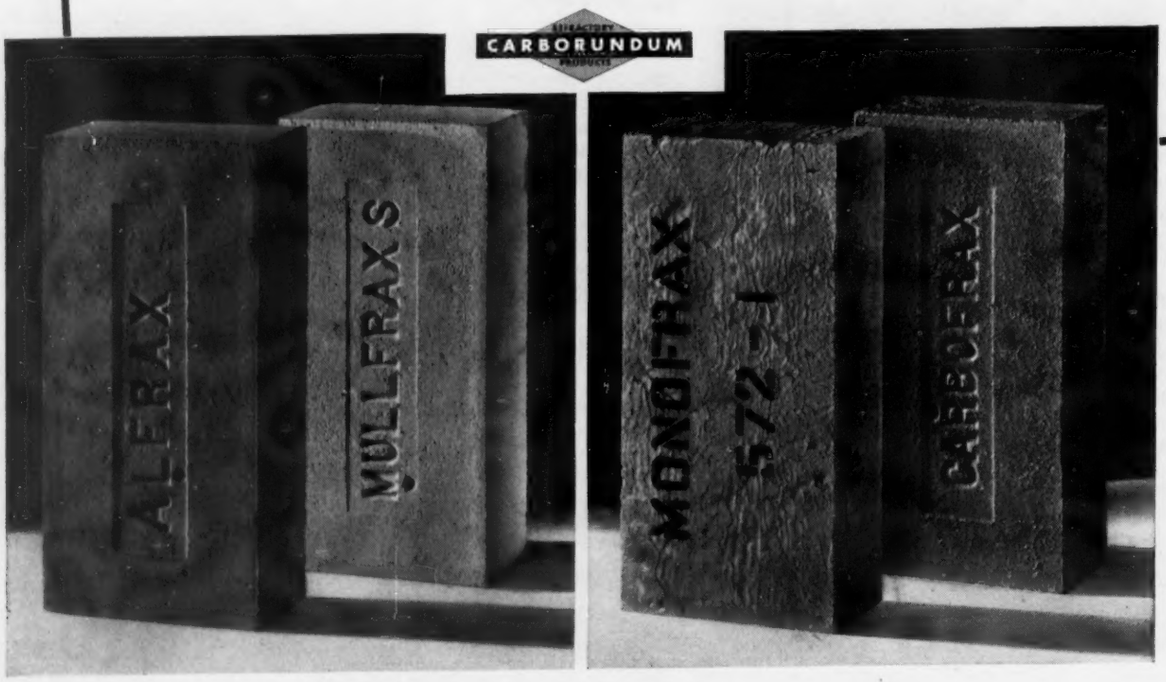
With this group of materials to choose from, we can offer you a super refractory practically tailor-made for the particular conditions of your furnace installation —a refractory or combination of refractories that will increase furnace production, reduce maintenance and repair expense or, in many cases, contribute to the improvement of your product.

Our experience gained over a period of twenty-five years of work with all types of furnace installations is available to you at any time. Let us prove that we can help you. Simply call in one of our representatives for a discussion.

THE CARBORUNDUM COMPANY
REFRACTORY DIVISION
Perth Amboy, N. J.

District Sales Branches: Boston, Chicago, Cleveland, Detroit, Philadelphia, Pittsburgh. Agents: McConnell Sales and Engineering Corp., Birmingham, Ala.; Christy Fire Brick Company, St. Louis; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Co., Los Angeles, San Francisco, Seattle; Denver Fireclay Co., El Paso, Texas.

(Carborundum is a registered trade-mark of and indicates manufacture by The Carborundum Company)



THIS NEW CHAMBERSBURG PNEUMATIC HAMMER WILL INCREASE PROFITS *because of*

1. Greater forging output than any other hammer of its type.
2. Higher impact speeds give higher productive capacity and permit forging at higher temperatures.
3. Anvil 20% more efficient than anvils of other hammers of this type.
4. Anti-friction bearings in the drive train.
5. Improved lubrication system.
6. Lower head room, vertical exhaust being replaced by air trap.
7. Lower center of gravity.
8. Completely enclosed driving train and counter-sunk foundation bolts for safety.

A smooth, powerful, self-contained, easily - operated hammer

Adaptable for one-man or two-man operation. Treadle permits one - man control, hand lever at side governs speed and power of blow in two-man operation.

● This is a piece of forge shop equipment of great possibilities. A new bulletin gives complete details of capacities and range of work. Write for Bulletin 1275.

CHAMBERSBURG ENGINEERING CO., CHAMBERSBURG, PA.

MY JOB IS A LOT With SEMS*

ONLY ONE UNIT TO HANDLE!

NO DROPPED LOCK WASHERS!

EASY TO KEEP UP TO SCHEDULE!

Can't COME OFF!

★ SEMS is the registered Trade Mark of Illinois Tool Works, manufacturers of Shakeproof Lock Washers. Only Shakeproof Lock Washers are used in the manufacture of SEMS Fastener Units.

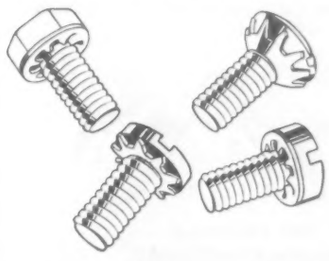
ALWAYS SPECIFY SEMS

Standard round head SEMS Fastener Units with external type Shakeproof Lock Washers are carried in stock for immediate delivery. Write for price list.

EASIER Fasteners!

PRE-ASSEMBLED SHAKEPROOF LOCK WASHER AND SCREW!

And, for the manufacturer who uses SEMS Fastener Units there are such rewards as reduced costs and improved product quality. The savings on lost lock washers alone make SEMS Fasteners practical. Also, they are easier to order, easier to stock and inventories always balance. Better product quality is certain because no screw can be driven without the right size and type of lock washer to hold it tight. Try SEMS Fasteners on your product—you'll find they make *your* job easier too.



SEMS Fastener Units are offered with any standard screw head in standard diameters and lengths.

SHAKEPROOF LOCK WASHER CO.

Distributor of Shakeproof Products Manufactured by ILLINOIS TOOL WORKS

2525 North Keeler Avenue, Chicago, Illinois

Plants at Chicago and Elgin, Illinois

In Canada: Canada Illinois Tools, Ltd., Toronto, Ontario

Copyright 1940 Illinois Tool Works

Shakeproof Screw Products are available with Phillips Recessed Heads

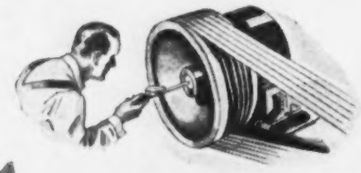
"Fastening Headquarters"

SHAKEPROOF

SEMS Fastener Units . . . Lock Washers . . . Locking and Plain Terminals

Thread-Cutting Screws . . . Locking Screws . . . Spring Washers . . . Special Stampings

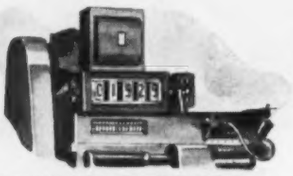
Apply these Simple Efficiency Present Methods TO CUT YOUR



1 IS THERE LOSS OF POWER THROUGH SLIPPAGE?

If your drives depend upon frictional contact, they waste power through slippage.

Silverstreak Silent Chain Drives cannot slip.



2 ARE YOU GETTING FULL MACHINE PRODUCTION?

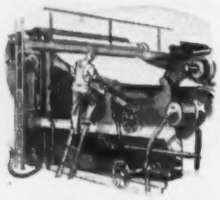
Your machine production is based upon speed of operation, but a drive that slips does not maintain the theoretical ratio from source of power.

Check the rated capacities of your machine with actual production output. There is no guesswork when Link-Belt Silverstreak Silent Chain Drives are used.

3 IS THE FINISHED PRODUCT UNIFORM?

If your product lacks uniformity, it may be due to slippage.

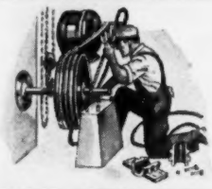
There can be no slip with positive Silverstreak Silent Chain Drives.



4 DOES THE DRIVE GIVE CONTINUOUS, UNINTERRUPTED SERVICE?

Are you obliged to make frequent costly adjustments to maintain belt tension?

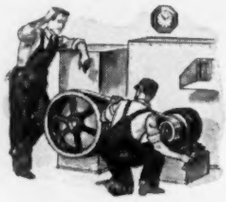
Silverstreak Silent Chain Drives avoid this condition because they combine flexibility with positive action.



5 IS INSTALLATION EASILY AND QUICKLY EFFECTED?

Must you dismantle any part of the machine to install a new belt? If so, how often is this necessary and how long is the machine down?

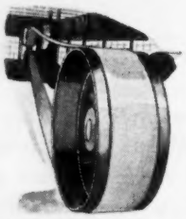
Silverstreak Silent Chain can be quickly and easily installed without dismantling bearings or parts of the machine.



6 DOES "MACHINE-DOWN TIME" AFFECT YOUR PRODUCTION?

What does "machine-down time" for adjustments and replacements cost you?

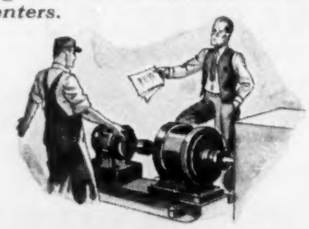
Silverstreak Silent Chain Drives last for years, and require practically no attention.



7 IS SPACE WASTED?

Are your drives compact?

Silverstreak Silent Chain Drives conserve valuable space by operating over small wheels on short centers.



8 ARE YOUR DRIVES READILY ADAPTABLE TO SPEED CHANGES?

Speed changes are easily accomplished with silent chain drives, by simply changing the diameter of the driver or driven wheel.

9 DOES IDLENESS CAUSE DETERIORATION?

Leather and rubber belts deteriorate when not in use. Are you paying this unnecessary penalty?

Silverstreak Silent Chain Drives are constructed of steel throughout. They are not affected by idleness.

10 DO ATMOSPHERIC CONDITIONS AFFECT YOUR DRIVES?

Is there any difference in the performance of your drives when the atmosphere is hot or cold, dry or damp?

Silverstreak Silent Chain is not affected by atmospheric conditions.

11 HOW LONG DO YOUR DRIVES LAST?

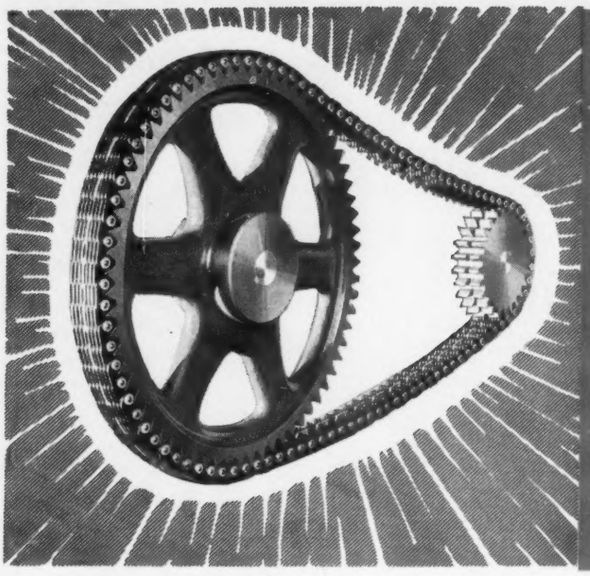
What is the life of your present drives?

A Link-Belt Silverstreak Silent Chain Drive will give uninterrupted service for many years with little or no maintenance.

12 IS ITS COST LOW—ALL THINGS CONSIDERED?

A low-first-cost is not wholly significant—in fact, it may be misleading. Check all the factors—add them up — and compare with cost of Link-Belt Silent Chain Drive —first cost or last cost.

Tests to your of Power Transmission PRODUCTION COSTS!



LINK-BELT *Silverstreak* SILENT CHAIN DRIVES

This Performance Check-Up May Reveal Hidden Profit Opportunities for You!

● Opportunities to cut production costs by using modern, efficient power transmission equipment, are not always apparent. Losses and waste may continue for years unnoticed and unsuspected, until revealed by a thorough check-up and comparison of methods and results. Here are twelve simple, easy tests for power transmitters — twelve important points to be considered. Check your drives against them now. Modern machinery and modern manufacturing methods require the correct drive for each service. Send for this comprehensive data book.

96-PAGE
Engineering Data Book
FREE!!

Send for Silverstreak Silent Chain Data Book 125. It is an engineering handbook that enables you to determine upon the correct drive and figure its cost. Thousands in use today. 8167

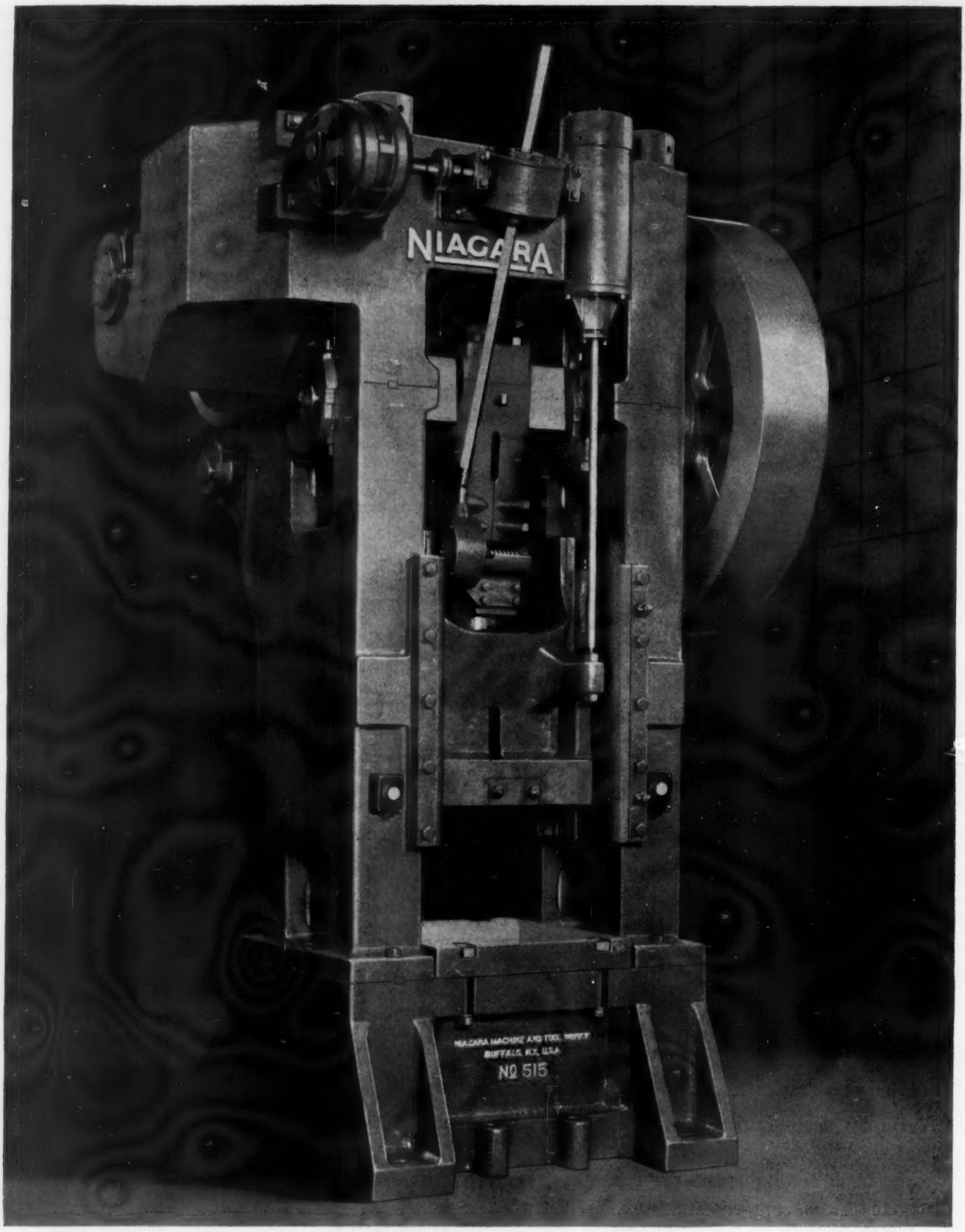
LINK-BELT COMPANY

The Leading Manufacturer of Positive Power Transmitting Equipment

INDIANAPOLIS	CHICAGO	PHILADELPHIA
220 S. Belmont Ave.	300 W. Pershing Road	2045 W. Hunting Park Ave.

ATLANTA	DALLAS	SAN FRANCISCO	TORONTO
1116 Murphy Ave., S.W.	500 Latimer St.	400 Paul Ave.	Eastern Ave. & Leslie St.

Baltimore . . Boston . . Buffalo . . Cleveland . . Denver . . Detroit . . Grand Rapids . . Houston
Huntington, W. Va. . . Kansas City, Mo. . . Los Angeles . . Louisville . . Minneapolis . . New Orleans
New York . . Oakland, Calif. . . Pittsburgh . . Portland, Ore. . . Salt Lake City . . Seattle
St. Louis . St. Paul . . Wilkes-Barre . . Montreal . . Swastika (Ontario) . . Vancouver



Niagara Series 50 Single Crank Presses are widely used in the production of heavy stampings requiring a concentrated pressure.

Manufacturers are taking advantage of their versatility in performing many operations essential to modern production,—including punching, shearing, blanking, trimming, forging, bending, drawing and embossing. They are also suitable for broaching, reducing and redrawing when provided with long strokes.

Built in a complete range of sizes. Write for Bulletin 63-C. Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, N. Y. Branches: Cleveland, Detroit, New York.

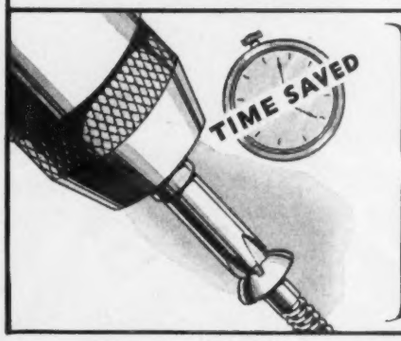
—Advt.

HOW TO KILL TIME ALL DAY AND DELIVER PRODUCTS FASTER

SLOTTED SCREWS ARE A SOURCE OF WASTED TIME AND EFFORT

GETTING SCREW STARTED — DRIVING WITH TWO HANDS — WHEN DRIVER SLIPS — PULLING OUT CROOKED SCREW

Why Fasten it the HARD Way, When it's QUICKER, CHEAPER and BETTER to Fasten With PHILLIPS Screws?



Quicker because Phillips Recessed Head Screws permit use of faster driving methods. Even when assembling easily-damaged, finished parts, power drivers can be used more often, since there's no danger of a slipping driver.

Cheaper because time is money and time-wasting operations—like boring pilot holes, withdrawing crooked or broken screws—are eliminated.

Better because assemblies are stronger, more attractive. Phillips Screws set up tight without split heads. Even inexperienced men do better with these easily-driven screws.

HERE'S WHY YOU SEE PHILLIPS SCREWS EVERYWHERE!

More and more manufacturers — large and small — are turning to this modern fastening method, to obtain time savings that average 50%. Orders are filled faster, money is saved, and the Phillips-fastened products have added sales appeal. Order from one of the manufacturers listed below.

PHILLIPS RECESSED HEAD SCREWS...

MACHINE SCREWS — SHEET METAL SCREWS — WOOD SCREWS — STOVE BOLTS

Speed Product Deliveries by Cutting Assembly Time

U. S. Patents on Product and Methods Nos. 2,046,343; 2,046,837; 2,046,839; 2,046,840; 2,082,085; 2,084,078; 2,084,079; 2,090,338. Other Domestic and Foreign Patents Allowed and Pending.

American Screw Co., Licensee, Providence, R.I.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corporation, New Britain, Conn.
The Lamson & Sessions Co., Cleveland, Ohio
National Screw & Mfg. Co., Cleveland, Ohio
Parker-Kalon Corporation, New York, N. Y.
Phoell Manufacturing Company, Chicago, Illinois
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Lock Washer Co., Chicago, Ill.

2 New Steels that give
REG. U.S. PAT. OFF.
REPUBLIC
STEEL
D
S
UNION MAXCUT
(BESSEMER)

UNVARYING

HIGHEST SPEED MACHINABILITY

-without sacrifice of soundness

● Union Drawn—pioneer in the production of efficient machining steels—now offers you a *new* Bessemer steel—UNION MAXCUT—and a *new* open-hearth steel—UNION MULTICUT—equal or superior in machining qualities to the finest and fastest screw steels available today—superior in soundness and FREE FROM VARIATION IN MACHINABILITY. Bar after bar can be machined at highest speeds with resulting fine surface finish and without reduction in tool life.

Produced through the combination of modern chemistry and an advanced process of manufacture, these new steels are remarkably sound and dense in structure—free from defects which cause internal seams and difficulties that lead to rejection of finished parts, and which shorten tool life and disrupt needed high-speed continuity of machining operations.

Because of their soundness and density of structure, Union Maxcut and Multicut materially reduce the percentage of rejections of heat-treated parts due to pitted surfaces which is usually associated with the use of fast-machining steels. They also eliminate the serious problem of disposition of steel scrap containing certain elements.

Results, of course, depend upon the nature of the product, equipment, speeds, feeds and desired tool life—but unless yours is a rare and exceptional case, Union Maxcut and Multicut will help you make important reductions in costs.

Order a production lot, either Bessemer or open-hearth as you require. Use it—then check your figures. We'll gladly send a Union Drawn Field Service Man to help you obtain best results. In the meantime, write for detailed information. Union Drawn Steel Division, Republic Steel Corporation, Massillon, Ohio.

UNION MAXCUT

A *new, uniform,* fast-cutting Bessemer steel—with physical properties comparable to S. A. E. X-1112. It machines equally as well or better than the highest-speed Bessemer. Parts show a smooth, fine finish when machined at 280 surface feet per minute with a basic feed of .0095" and an average tool life of more than 11 hours. The use of lighter feeds, of course, permits much higher cutting speeds. Union Maxcut responds to cyaniding and other case hardening treatments in a similar manner to S. A. E. X-1112.

UNION MULTICUT

A *new, uniform,* fast-cutting open-hearth steel—with physical properties similar to S. A. E. 1115. Machining results are equal or superior to those of the highest-speed open-hearth steel. Parts show a fine finish comparable to Bessemer screw stock when machined at 275 surface feet per minute with a basic feed of .0087" and an average tool life better than 8 hours. With lighter feeds this steel can be run up to 350 surface feet per minute with satisfactory results. Union Multicut can be carburized and hardened to a minimum case hardness of C-60 Rockwell with either single or double quench. It produces a very tough, ductile core in small case hardened parts with a minimum of distortion in quenching.

UNION MULTICUT

(OPEN-HEARTH)

FREE-MACHINING BAR STEELS

GADGETS

Little things that save you MONEY

No matter what your requirements for small metal parts may be, Townsend engineers can quickly solve your problem. Expensive screw machine products *may* be required, and then again, quite probably less expensive Townsend GADGETS will do the job just as well—and at considerably less cost.

Shown are just a handful of typical GADGETS that we have made . . . you may need something entirely different . . . but somewhere among the thousands of GADGETS that we have been called upon to produce, is something similar to your needs.

Just send us the coupon below, together with a rough sketch, blueprint or sample of the part you are now using, and we'll show you how to save production and parts dollars . . . without incurring any obligation, of course.

THE TOWNSEND COMPANY,
New Brighton, Pa.

Gentlemen: We are interested in your offer to save our company money . . . please send us some evidence that Townsend GADGETS will solve our problem.

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

SIGNED _____ POSITION _____

☐ Enclosed is a sketch, blueprint or sample of the part we need. ... Is there a Townsend GADGET that will solve our problem?

GADGETS are the thousands of unnamed metal parts . . . sometime headed, threaded, knurled, upset, formed or otherwise shaped . . usually small, sometimes large . . . made from almost any metal.

TOWNSEND COMPANY

Since 1816

NEW BRIGHTON, PENNSYLVANIA

(Pittsburgh District)

The Largest Rivet and the Oldest Wire Manufacturers in the World

SOLID AND TUBULAR RIVETS—SPECIAL WIRE NAILS—HEADED METAL PRODUCTS—AND WIRE SPECIALTIES—IN ALL METALS